Creating a Framework of Environmental Activities

prepared for:

Agriculture and Agri-Food Canada

prepared by:

Marbek Resource Consultants

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Note to Users

This package contains a series of presentation slides and speaker's notes. The slide deck contains 15 modules. It is not intended that all modules be presented at any one time. It is recommended that modules 1, 14, and 15 be used in all presentations. In addition, a selection of the Issue Modules (numbers 2-13) would be made for each presentation; the choice would depend on the audience, purpose of the presentation, etc.

Background

102-02574/

AGRI-FOOD INDUSTRY ENVIRONMENTAL INDICATORS: BACKGROUND NOTES

Submitted by Marbek Resource Consutants Ltd.
May 1995

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1. INTRODUCTION

In the slide deck *Creating a Framework of Environmental Activities*, the environmental issues of most importance to the agri-food industry have been considered in three broad categories:

- Process inputs (resource consumption/conservation)
- Process outputs (principally air pollution, water pollution, and solid waste)
- Cross-cutting issues (such as hazardous materials and environmental management).

It would be desirable to develop indicators of industry performance regarding selected key issues within each of these categories. Unfortunately, there is a scarcity of information about the environmental performance of the agri-food industry on which indicators may be based.[1] As a result, the slide deck provides indicators in only three areas: energy use, carbon dioxide emissions, and packaging use.

The following discussion provides details on these indicators, and an overview of some of the constraints that limit development of additional indicators.

Apart from issue-specific indicators, it would also be desirable to provide more general indicators of environmental performance. Again, data availability is insufficient to support such indicators. A Statistics Canada report planned for 1997 on *Human Activity and the Environment* will provide some information not now available, such as expenditures on pollution abatement, which might be used as a general indicator of environmental performance. Data on regulatory compliance, another general indicator, are expected to be reported by more jurisdictions in the future.

2. PROCESS INPUTS

In *Creating a Framework of Environmental Activities*, consumption of three types of resource was discussed: energy, water, and raw materials used for production and packaging. Energy use is considered environmentally significant and there are data available that can be used as an indicator (further details are provided below). For water and raw materials use, however, it has not been possible to develop indicators:

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[1] This project was limited in scope, and as such did not allow an exhaustive review of available data sources, or provide for the processing and refinement of existing data. The conclusions here regarding data availability are subject to this qualification.

- The environmental significance of water use depends greatly on the abundance of the local water source. Data on industry water consumption are limited in time or geographic coverage.

- Data on the use of raw materials for production of food and beverage products, or for retail and food service operations, have not been identified. Data on the consumption of packaging materials are available, but an indicator which addresses packaging intensity in an instructive manner cannot be readily generated based on this information.

2.1 Energy

Energy use data are available from a Canadian Industry Program for Energy Conservation (CIPEC) database on manufacturing energy used by food and beverage producers. Industry sector information is available at the three digit SIC level and for some sectors at the four digit SIC level. This data includes some, but not all, transportation needed to produce and deliver goods. The availability and quality of energy data on the food and beverage industry should increase as this industry group is more fully included in CIPEC data reporting and analysis.

The proposed indicator is energy intensity of manufacture, expressed as TeraJoules per million dollars of shipments. The data presented in Table I for the years 1990-92 are shown for the sum of all food and all beverage industries and for four CIPEC-defined task force groups within those industries.

CIPEC data were obtained from Natural Resources Canada, Energy Ventures Division. Statistics Canada publications *Food Industries*, Cat. No. 32-250 and *Beverage and Tobacco Products Industries*, Cat. No. 32-251 were consulted for value of shipments data, from which the intensities were derived.

Table I: Energy Intensity of Manufacture
TeraJoules per Million Dollars of Own Manufacture (constant dollars)

	SIC	1990	1991	1992
All Beverage Industries **	1100	2.92	2.67	2.17
Breweries	1131	2.71	2.35	2.48
All Food Industries	1000	2.30	2.34	2.08
Food Processors:		2.10	2.01	1.58
Meat and Poultry	1010			
Dairy Products	1040			
Flour, Prep. Cereal Food and Feed	1050			
Bakeries	1070	2.88	2.90	2.53
Grocery Products:		3.62	3.26	2.76
Fruit and Vegetables	1030			
Other Food Products	1090			

** Note: Wineries are not included due to confidentiality of data

3. PROCESS OUTPUTS

In *Creating a Framework of Environmental Activities*, the process outputs of greatest environmental significance were identified as air pollution (particularly ozone layer depletion and climate change), water pollution, and solid waste. There are data available to support indicators relating to climate change and solid waste (further details are provided below). For ozone layer depletion and water pollution, however, it has not been possible to develop indicators:

- Environment Canada has presented national and global indicators relating to ozone layer depletion, but industry-specific data to support an indicator of agri-food industry performance have not been found.

- Water pollution data exist in a small number of municipalities in the form of sewerage surcharges for businesses discharging effluent to municipal sewers, and for very few processing plants which are direct dischargers. This data does not appear to be adequate to support an industry-specific indicator.

3.1 Climate Change

Carbon dioxide and chlorofluorocarbons are the most important greenhouse gases for the agri-food industries. The proposed indicator is carbon dioxide emissions from energy conversion, based on CIPEC data. Data on CFC use or emissions by industry sector have not been located. The data presented in Table II for the years 1990-92 are shown for the sum of all food and all beverage industries, and for four CIPEC-defined task force groups within those industries. CIPEC data were obtained from Natural Resources Canada, Energy Ventures Division.

Table II: Carbon Dioxide Emissions (Thousands of Tonnes)

	SIC	1990	1991	1992
All Beverage Industries **	1100	818.0	745.8	689.6
Breweries	1131	319.6	300.1	304.7
All Food Industries	1000	4,557.6	4,844.0	4,322.9
Food Processors:		1,559.5	1,621.0	1,391.7
Meat and Poultry	1010			
Dairy Products	1040			
Flour, Prep. Cereal Food and Feed	1050			
Bakeries	1070	264.4	267.0	266.0
Grocery Products:		1,039.4	1,020.4	1,009.4
Fruit and Vegetables	1030			
Other Food Products	1090			

** Note: Wineries are not included due to confidentiality of data

The indicator is presented in absolute terms -- total carbon dioxide emissions. It is not presented on an intensity basis (per million dollars of output, for instance), to coincide with Canada's greenhouse gas emission targets, which are presented in absolute terms.

3.2 Solid Waste

The two most significant solid waste streams from agri-food industries are organic wet waste and packaging waste. It would be preferable to have an indicator that reflected all waste streams, but only packaging waste data are available nationally. The National Packaging Monitoring System provides data at the three digit SIC level on packaging consumed, reused, recycled and disposed.

The proposed indicator is the total amount of packaging disposed by industry sector. Note that this indicator is presented in absolute terms rather than on an intensity basis (per million dollars of output, for instance). This coincides with the NAPP packaging reduction targets, which are presented in absolute terms.

Data from the 1990 and 1992 packaging surveys are presented in Table III. Note that for some sectors there are large differences between survey years -- the retail food, beverage, drug and tobacco sector is an example. These differences are attributed to changes in survey method and to sample size, and as such may not reflect actual changes in the marketplace. Comparisons of 1992 and 1996 data, the next year for which a survey has been planned, should be more instructive.

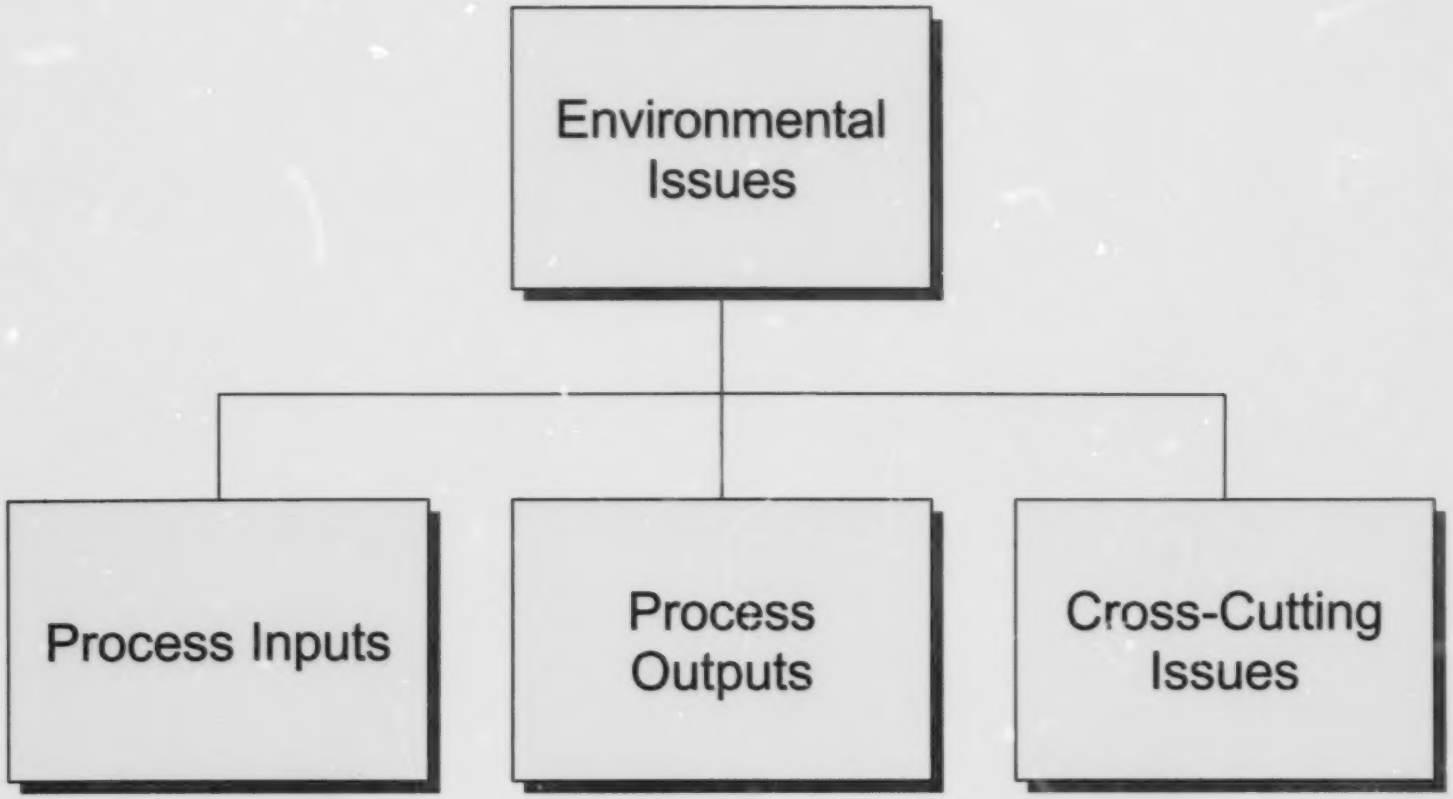
Table III: Packaging Disposed by Industry Sector
All Packaging Types (Tonnes)

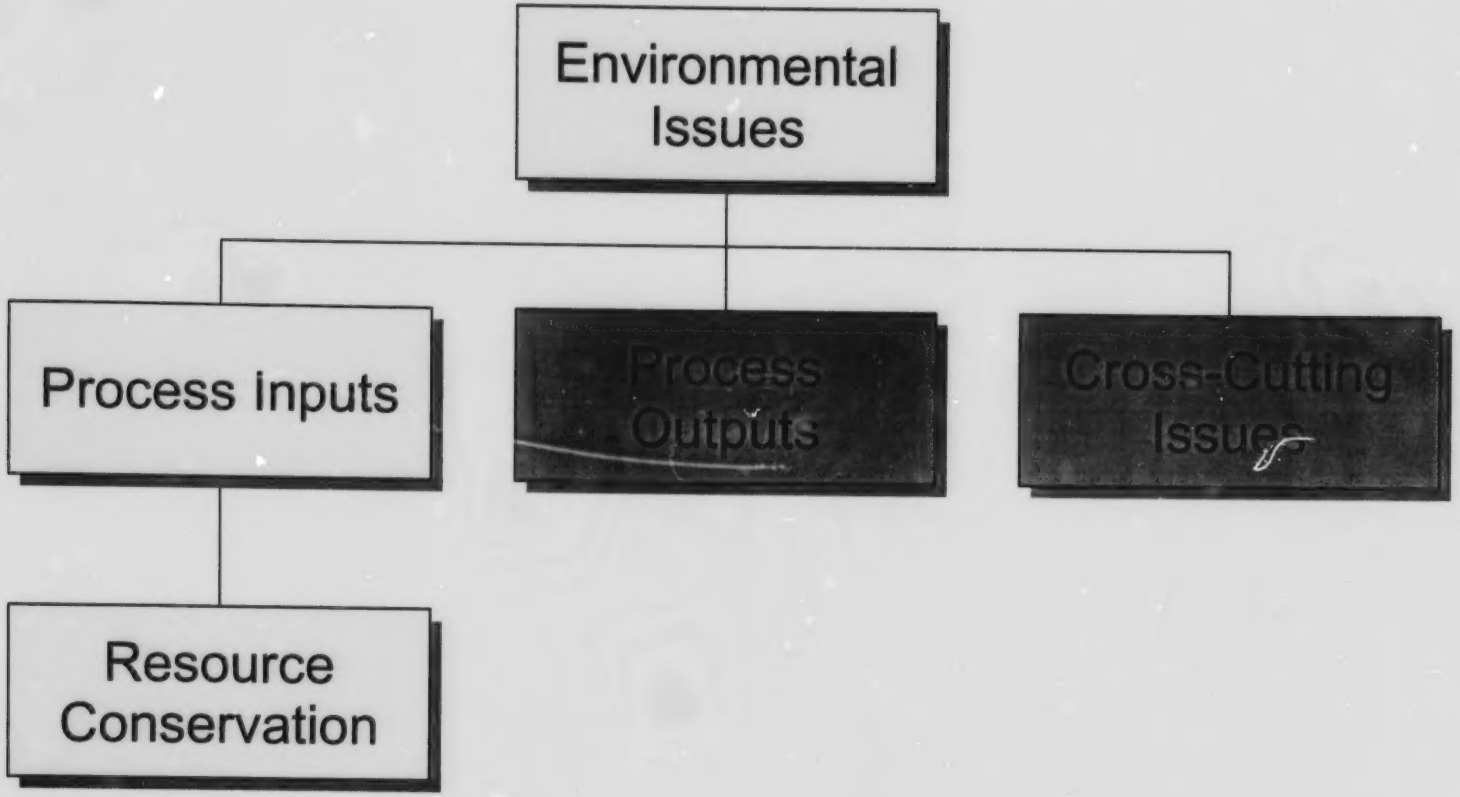
Industry Sector	1990	1992
Food industry (total)	1,642,402	1,285,849
Meat, poultry, fish	197,622	177,187
Fruit and vegetable	333,960	318,819
Dairy	240,670	175,010
Flour, cereal food, and feed	152,873	122,487
Bakery	141,140	49,801
Sugar & confectionary	116,036	129,675
Other food	460,101	312,870
Beverage industry (total)	630,638	430,208
Soft drink	227,410	270,373
Brewery	225,781	59,333
Distillery & wine	177,447	100,502
Wholesale food, beverage, drug, tobacco	52,392	44,126
Retail food, beverage, drug, tobacco	54,361	224,324

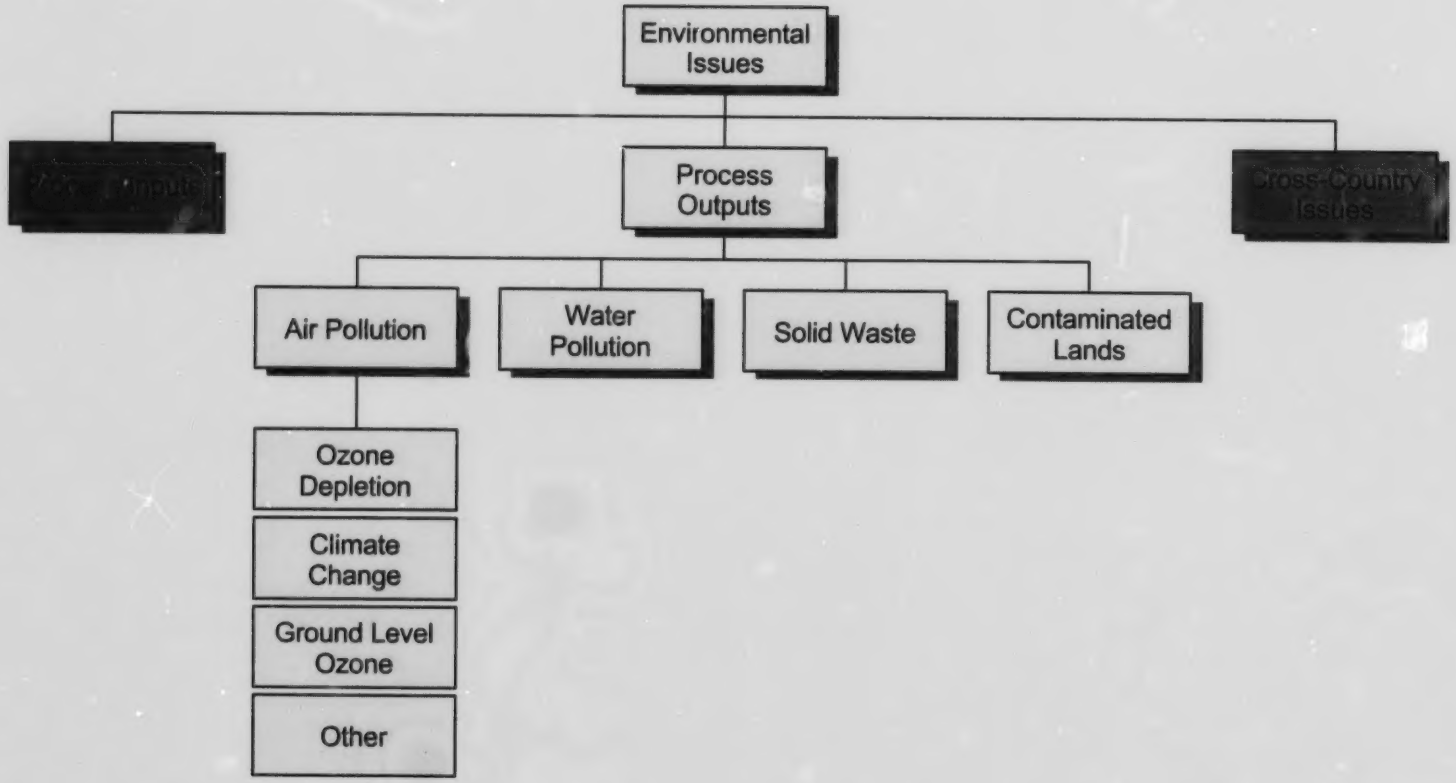
4. CROSS-CUTTING ISSUES

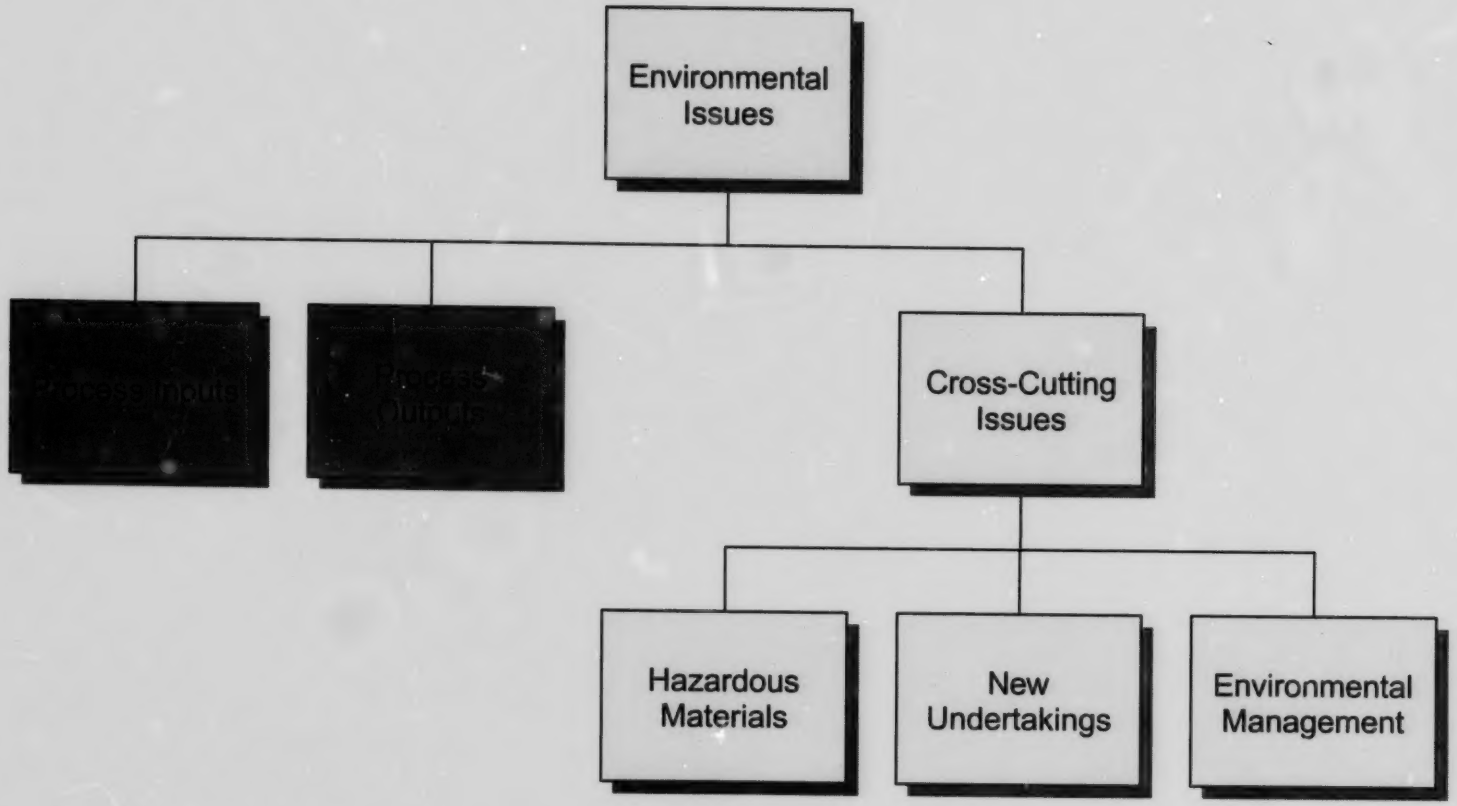
In *Creating a Framework for Environmental Activities*, three cross-cutting issues were identified: hazardous materials, new undertakings, and environmental management. No information sources were identified that provided meaningful indicators for the agri-food industry, with respect to any of these issues.

WHAT ARE THE ISSUES




Environmental Issues
Process Inputs
Process Outputs
Cross-Cutting Issues
Resource Conservation


Environmental Issues
Process Outputs
Air Pollution
Water Pollution
Solid Waste
Contaminated Lands
Ozone Depletion
Climate Change
Ground Level Ozone
Other


Environmental Issues
Process Inputs
Process Outputs
Cross-Cutting Issues
Hazardous Materials
New Undertakings
Environmental Management

Title Slide

AGRI-FOOD INDUSTRIES AND THE ENVIRONMENT:

CHALLENGES AND OPPORTUNITIES

Module 1:

Introduction -- Agri-Food Industries and the Environment

AGRI-FOOD INDUSTRIES AND THE ENVIRONMENT:

INTRODUCTION

THIS PRESENTATION

Agri-food industries and the environment:

- Why is this topic important?
- What are the issues?
- How is industry doing?
- What are the trends?

MODULE 1 - AGRI-FOOD INDUSTRIES AND THE ENVIRONMENT

Note to presenters:

This module consists of 9 slides

OR1	Title slide
OR2	This presentation
OR3	Why is this topic important?
OR4	What drives the issues?
OR5	Do you know about?
OR6	What are the issues?
OR7	Issues - process inputs
OR8	Issues - process outputs
OR9	Cross-cutting issues

- This presentation will give an overview of the important environmental issues facing the Canadian agri-food industry and what is being done to respond to these issues.

- **FIRST**, we will start by explaining why responding to environmental concern is important for Canadian business. For companies that know the issues and respond positively to the challenges, there are opportunities to improve business and the environment at the same time.

- **SECONDLY,** some of the major environmental issues will be discussed - their impact, how to reduce the potential for harm, the regulatory background, the response of industry and government to the issue, and some of the opportunities that lie in improving environmental performance. This will be the largest part of the presentation.

  While there will be a discussion of the regulatory background and requirements for each issue, legal advice is not offered.

- **THIRDLY**, we will look at how to measure industry performance on some of the issues.

- **FINALLY**, we will look at some trends in environmental priorities that will affect the agri-food industry.

WHY IS THIS TOPIC IMPORTANT?

- Legal Requirements
- The Bottom Line
- Competitiveness in the Marketplace
- Corporate Responsibility

- Environmental performance is significant to industry in a number of ways:

  - *Legal Requirements:* First there is the obligation for companies to operate within the law and to minimize the frequency and severity of environmental offenses.

    The arguments for placing a high priority on environmental matters of course go beyond simple compliance:

  - *The Bottom Line:* Superior environmental performance can help to avoid the costs, lost time and resources which can be consumed in litigation, mitigation of harmful impacts, and remediation of environmental problems.

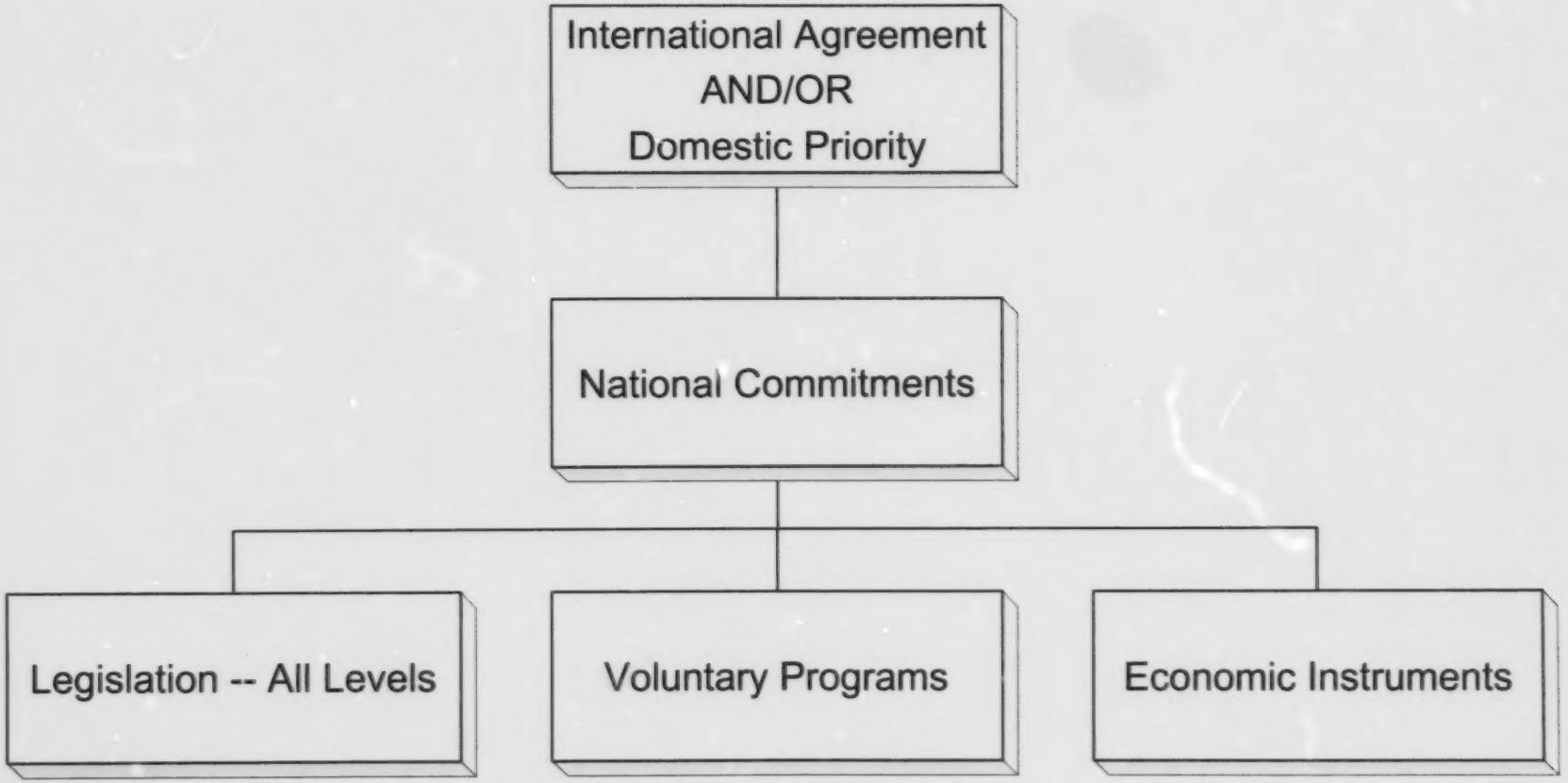
    More efficient use of resources, reduced waste production, and the recovery of value in the form of energy, product, or packaging from waste can all have financial and environmental benefits.

  - *Competitiveness in the Marketplace:* A positive public image based on environmental record can provide market opportunities with all levels of consumers who screen for green products - householders, corporations, institutions and governments.

    The converse is also true; that is, markets and customers can be lost because of poor environmental performance.

  - *Corporate Responsibility:* Finally, companies have a responsibility to their shareholders, their employees and the communities in which they operate, and to the public at large, to continue business in an economically and environmentally sustainable way.

WHAT DRIVES THE ISSUES?



DO YOU KNOW ABOUT?

- Ban on CFC manufacture and import Dec'95?
- Packaging waste reduction targets?
- Greenhouse gas targets
- Methyl bromide phaseout starting 1998?
- ISO 1400 environmental management

- This slide illustrates how international and national environmental issues can affect the local grocer or restaurant owner choosing a refrigerator or disposing of garbage.

- Control of ozone-depleting substances, a global priority, is "driven" by an international agreement, the Montreal Protocol. Canada has made commitments to meet the protocol schedule to phaseout and ban certain chemicals. Legislation at all levels of government has been enacted to meet these commitments. Industry has voluntarily undertaken research on substitute materials and processes. As bans on new refrigerant CFC, for example, come into effect, businesses may find the cost of recovered and recycled refrigeran: high enough to warrant early equipment replacement.

- Solid waste is a domestic priority, resulting in legislation at all levels aimed at achieving a 50% reduction by 2000. Numerous voluntary programs to minimize waste have developed. The National Packaging Protocol is one example. Landfill surcharges and bans, and now the high value placed on some recyclable materials, provide economic incentive for businesses to source-separate their wastes.

Here are some examples of issues that may affect you:

- After December 1995, CFCs, now used in refrigeration and air conditioning, will no longer be made or imported into Canada. Only recovered and recycled material will be allowed.

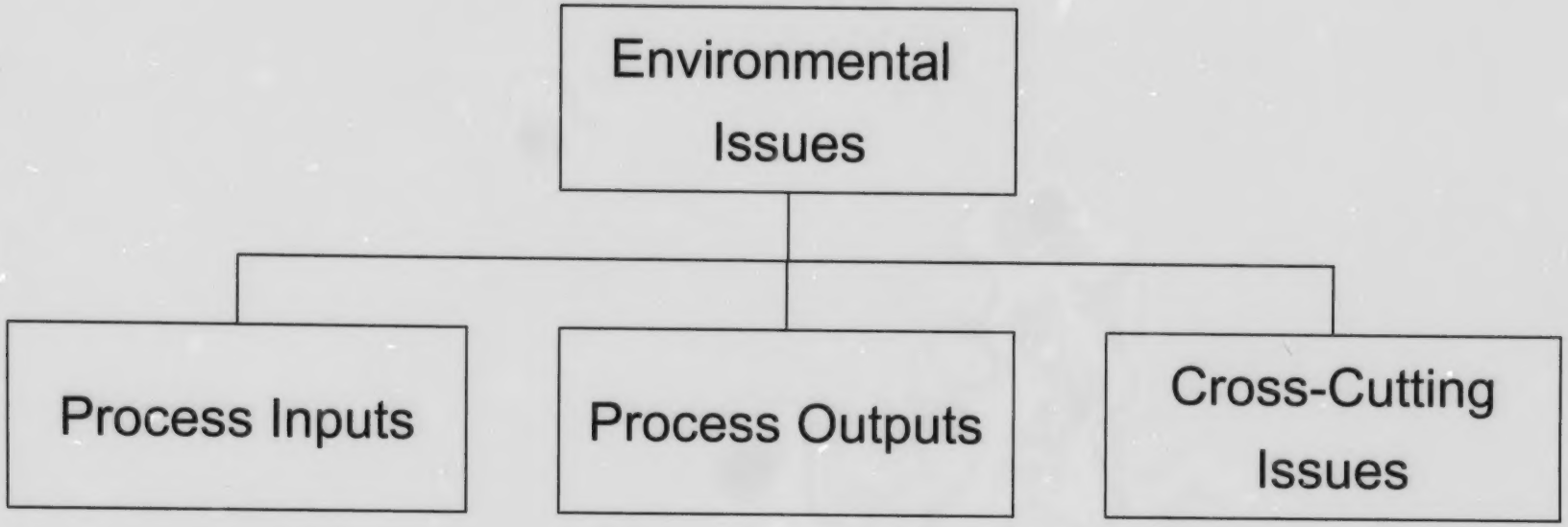
- The amount of packaging sent to disposal by food and beverage industries decreased from 1990 to 1992 by 21 and 32 percent respectively. The goal for 1996 is a 35% reduction and for 2000, a 50 percent reduction.

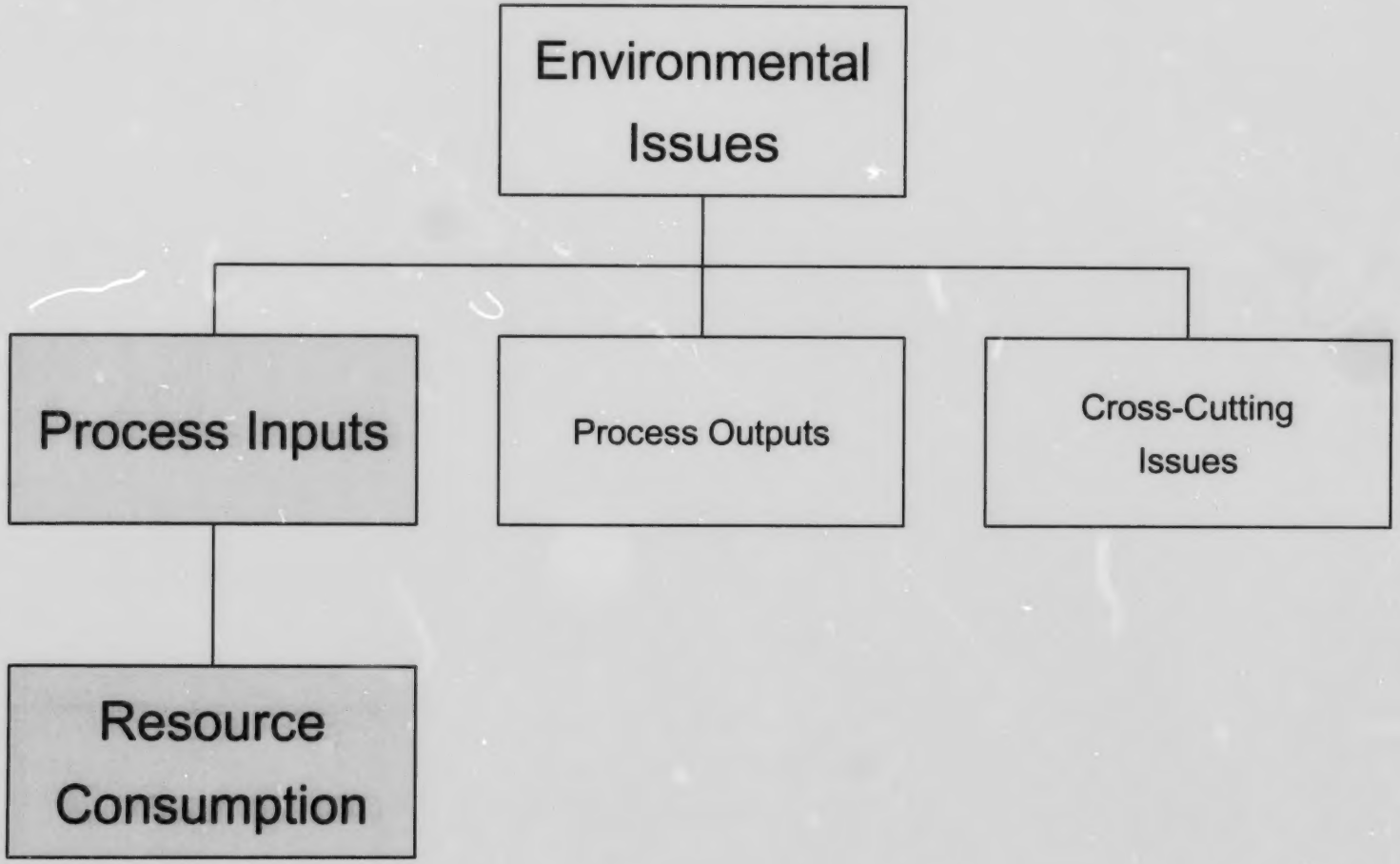
- The National Action Program on Climate Change aims to stabilize Canadian greenhouse gas emissions by 2000 to 1990 levels, and Canadian municipalities are planning a 20% reduction in greenhouse gases by 2005.

- In 1998, a scheduled reduction will be implemented for methyl bromide, a fumigant used for grains, cereals, fresh fruits and vegetables.

- Meeting ISO 14000 environmental management standards, which are now in development, may in the future be required by your customers.

WHAT ARE THE ISSUES?

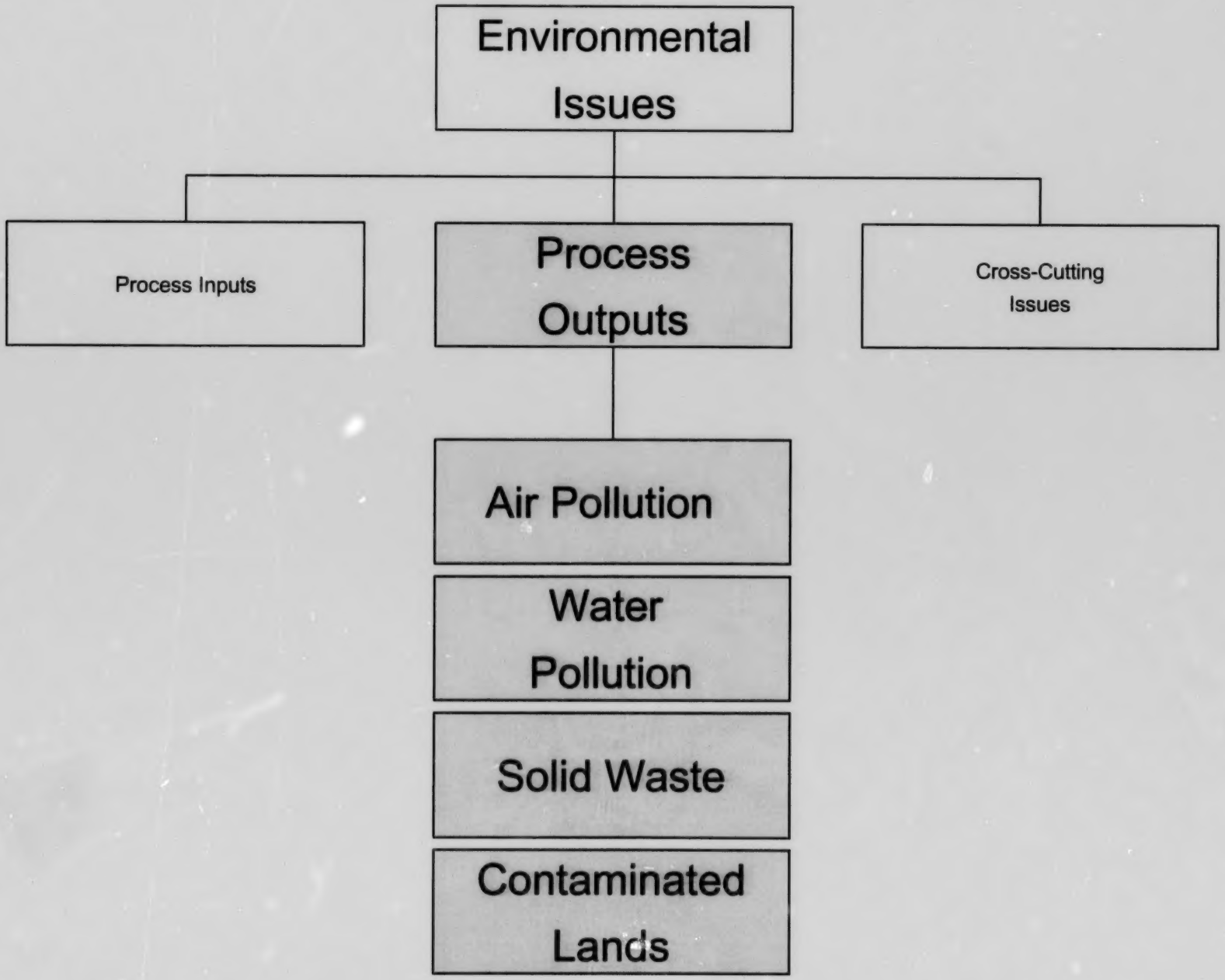



Environmental Issues
Process Inputs
Process Outputs
Cross-Cutting Issues
Resource Consumption

- The environmental impacts of the agri-food industry can be categorized as arising from:

  - Process inputs;
  - Process outputs; and
  - The cross-cutting issues

- Resource conservation is the key topic to be discussed under process inputs.


Environmental Issues
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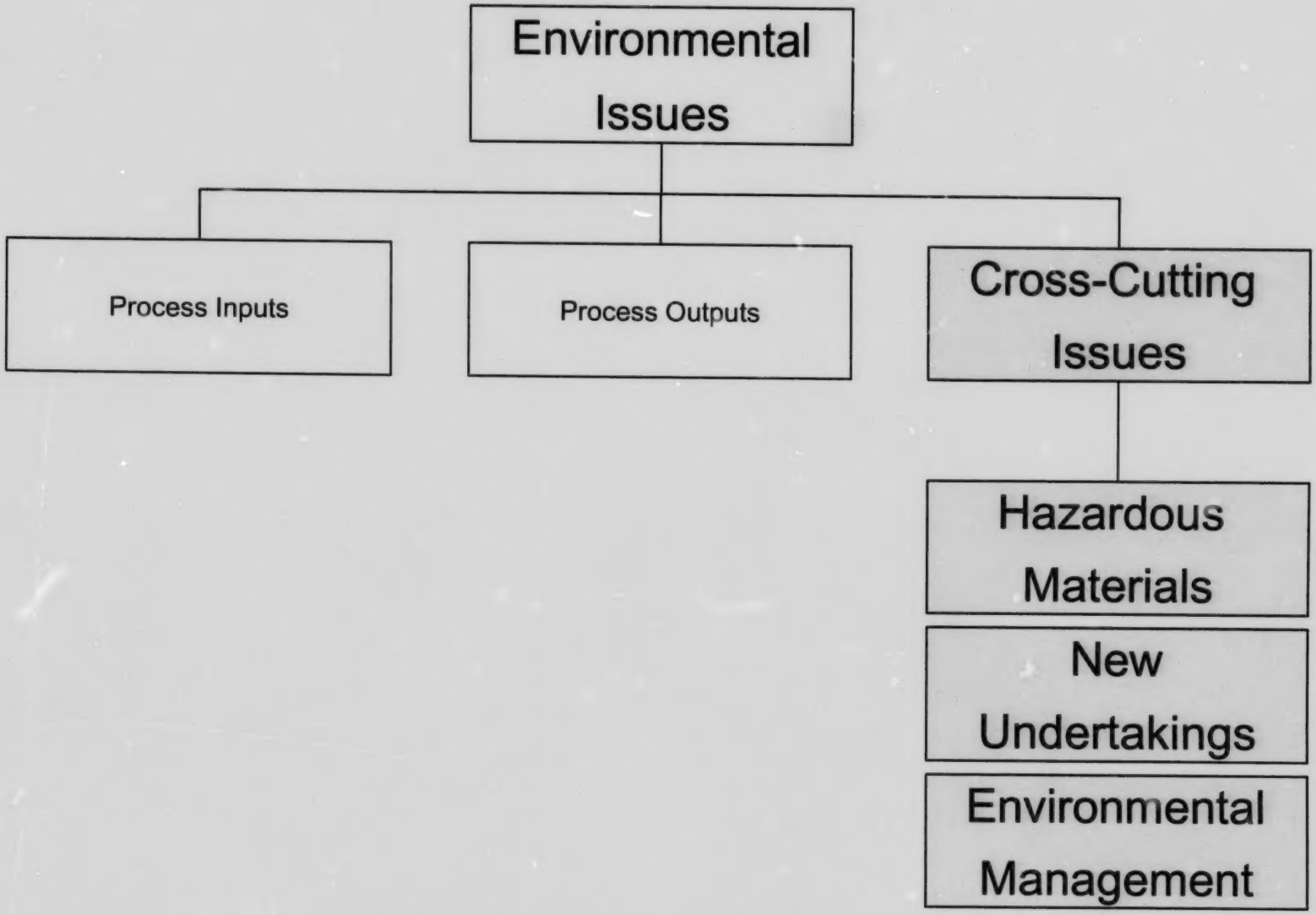
Air Pollution
Water Pollution
Solid Waste
Contaminated Lands


Environmental Issues
Process Inputs
Process Outputs
Cross-Cutting Issues
Hazardous Materials
New Undertakings
Environmental Management

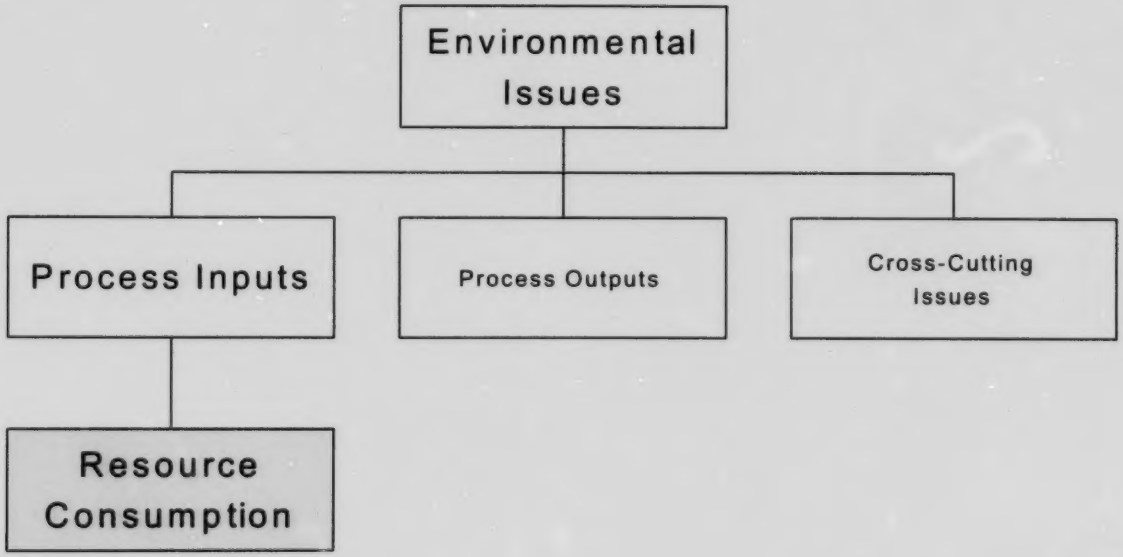
- Process outputs are categorized into issues involving air pollution, water pollution, solid waste and contaminated lands.

- The air pollution issues which will be treated separately later in this presentation, are ozone depletion, climate change, ground level ozone, and other local issues.

- The important cross-cutting issues which will be discussed are hazardous materials, new undertakings, and environmental management.

Module 2:
Resource Consumption

RESOURCE CONSUMPTION



Issues

- Management of renewable resources
- Depletion of non-renewable resources
- Collateral impacts (climate change, solid waste)

Module 2 - Resource Consumption

Note to presenters:

This module consists of 8 slides:

RC1	Title slide
RC2	Issues overview
RC3	Response to the issues
RC4	Most affected sectors
RC5	Voluntary action: Energy
RC6	Voluntary action: Water
RC7	Voluntary action: Raw materials
RC8	Business opportunities

- Management of resource consumption and prevention of wasteful resource use are key factors in fostering a sustainable economy.

- Management of renewable resources such as agricultural products, to ensure continued supply; wise use of non-renewable resources such as fossil fuels, to prolong supplies; and care of replenishable resources such as clean water and air, all figure in resource conservation.

- Conserving resources can have collateral benefits in reducing solid waste and water pollution and slowing the rate of global warming.

Response

- Conserve
  - Energy
  - Water
  - Raw materials
- Apply 3Rs strategies to all
  - Reduce
  - Reuse
  - Recycle

Most Affected Sectors

- Energy and water:
  - Meat and poultry, fruit and vegetable, dairy, brewery, all beverage producers
- Raw Material - Packaging:
  - Fruit and vegetable, soft drink, grocery retail
- Raw Material - Processing:
  - All sectors affected

- Conservation measures which are voluntary and those which are put into effect through regulation and economic instruments need to be applied to energy, water and raw material consumption.

- The hierarchy of reduce, reuse and recycle can be applied to conservation of each of these resources.

- Agri-food industry sectors which are energy and water intensive are most affected by conservation initiatives, voluntary or regulatory. These include meat and poultry processors, dairies, fruit and vegetable processors, breweries, and other beverage producers.

- Packaging reduction initiatives under the National Packaging Protocol and provincial legislation affect all sectors. Using the amount of packaging disposed as an indicator of resource use, fruit and vegetable processors, soft drink manufacturers and grocery retailers are the three agri-food sectors which have the largest opportunity to improve conservation of packaging materials.

  Packaging use and the National Packaging Protocol will be covered in the discussion of solid waste.

- The agri-food industry is an efficient user of the raw materials used to make food and beverage products. All sectors from processors to food service operators are affected by a need to

conserve resources.

Voluntary Action: Energy

- Canadian Industry Program for Energy Conservation
  - Food & beverage included in 1995
- Utility company energy audits, assistance
- Provincial department audits, assistance
- Energy service company financing

Voluntary Action: Water

- CCME National Action Plan to Encourage Municipal Water Use Efficiency

- Focus:
  Consistent water efficiency policies, regulations and codes
  - Full cost pricing
  - Education, audits

- The Canadian Industry Program for Energy Conservation, CIPEC, is a voluntary initiative of industry, supported by government. It promotes and monitors energy efficiency in different industrial sectors. The food and beverage industries are scheduled for inclusion in 1995 in data collection and analysis on energy use.

- Gas and electric utilities and government environment departments may conduct or fund energy audits and assist with retrofits.

- Financing of energy efficiency improvements can be facilitated through energy savings achieved in arrangements with energy service companies.

- The CCME approved in 1994 a National Action Plan to Encourage Municipal Water Use Efficiency.

- Many of the measures recommended are directed at municipal water service operations, but some may directly affect industry, such as recommendations for:
  - consistent water efficiency policies, regulations, and codes;
  - full cost pricing of water, accurately metered; and
  - water use audits, incentives for retrofits, and public education

Voluntary Action: Raw Materials

- National Packaging Protocol
  - Packaging reductions to achieve 50% waste diversion
  - 3Rs hierarchy of reduce, reuse and recycle

Business Opportunities

- Material cost reductions
- Processing cost reductions
- Waste disposal cost reductions
- Product development

- The National Packaging Protocol, with a goal of reducing packaging by 50% by 2000, will continue to have significant impacts on raw material consumption for packaging.

- The 3Rs hierarchy of waste reduction strategies has resulted in packaging redesign to achieve source reductions, to increase the amount and variety of packaging which can be reused and has accelerated development of recycling infrastructure.

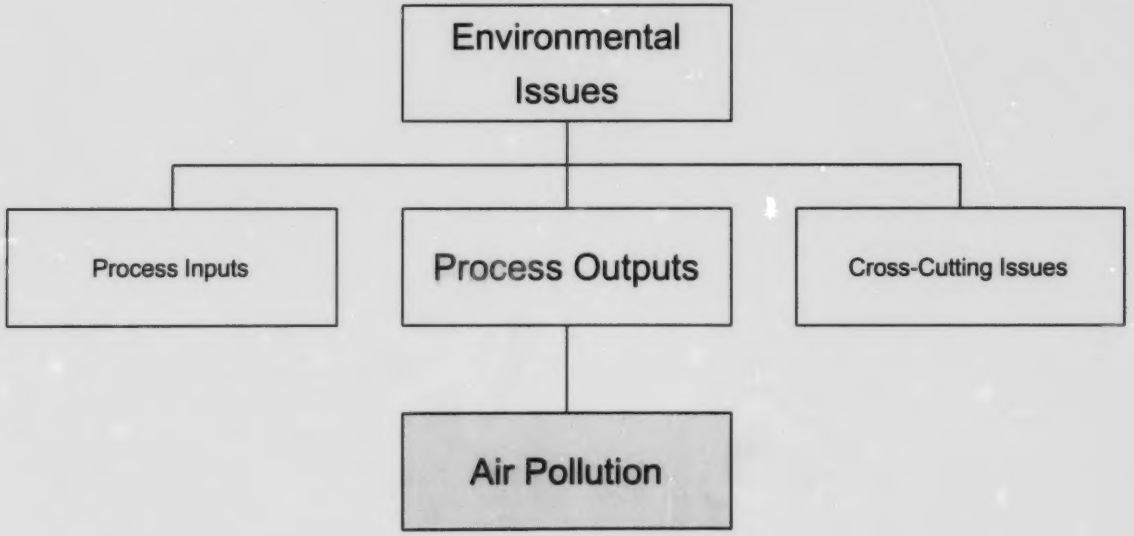
- The principal business opportunities in resource conservation arise from cost reductions in processing inputs such as energy, water, process raw materials and packaging.

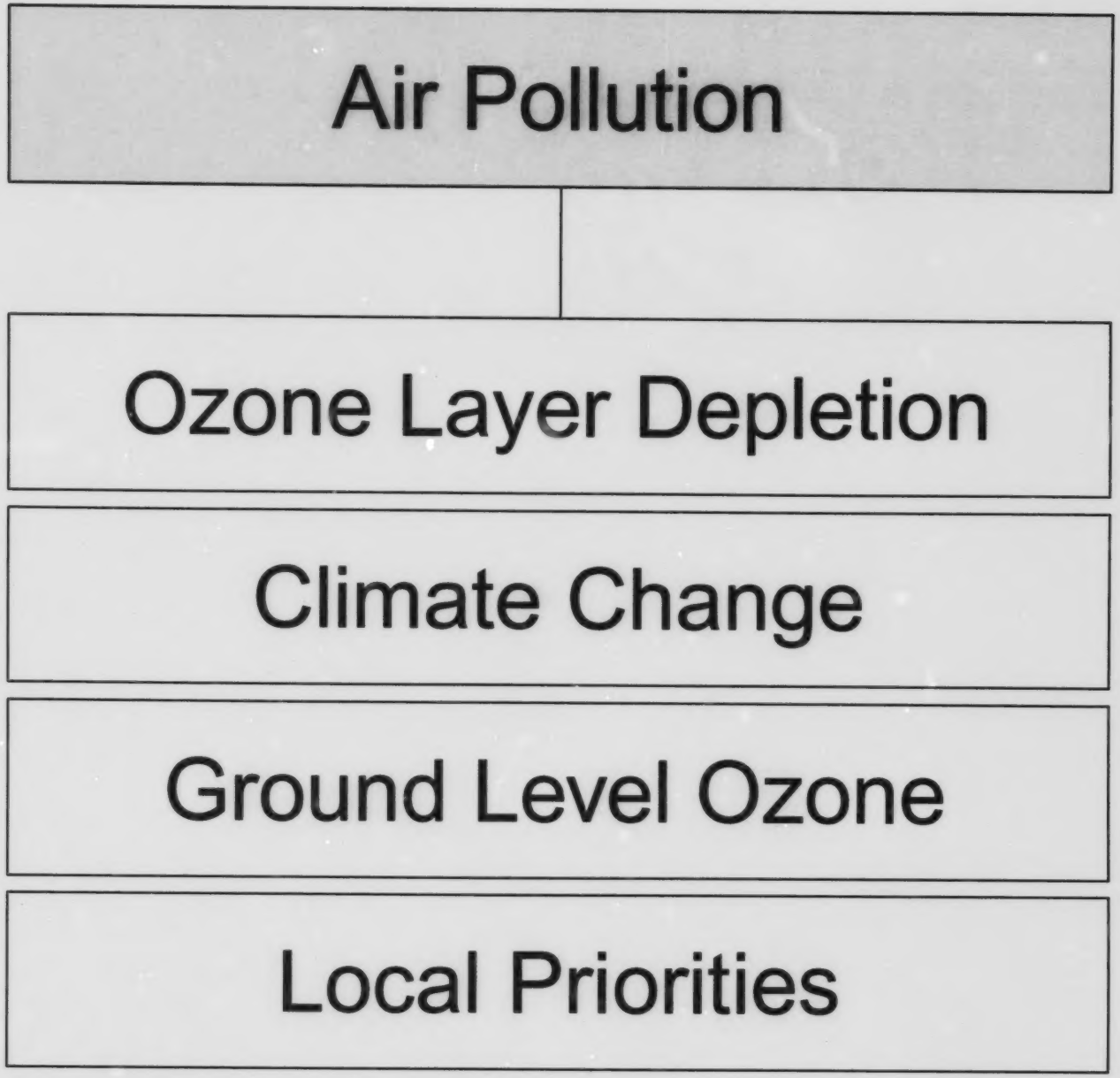
- Strategies to conserve resources can have collateral benefits in:
  - waste water treatment costs - for example, recovering a higher percentage of dairy fat in milk processing will reduce biological oxygen demand of effluent and sewer surcharges;
  - waste disposal costs -- efficient use of process and packaging materials reduces the amount of waste; and
  - development of markets for new products made from materials that otherwise would be sent to disposal.

Module 3:
Air Pollution Overview

AIR POLLUTION

OVERVIEW




Air Pollution
Ozone Layer Depletion
Climate Change
Ground Level Ozone
Local Priorities

Module 3 - Air Pollution Overview

Note to presenters:

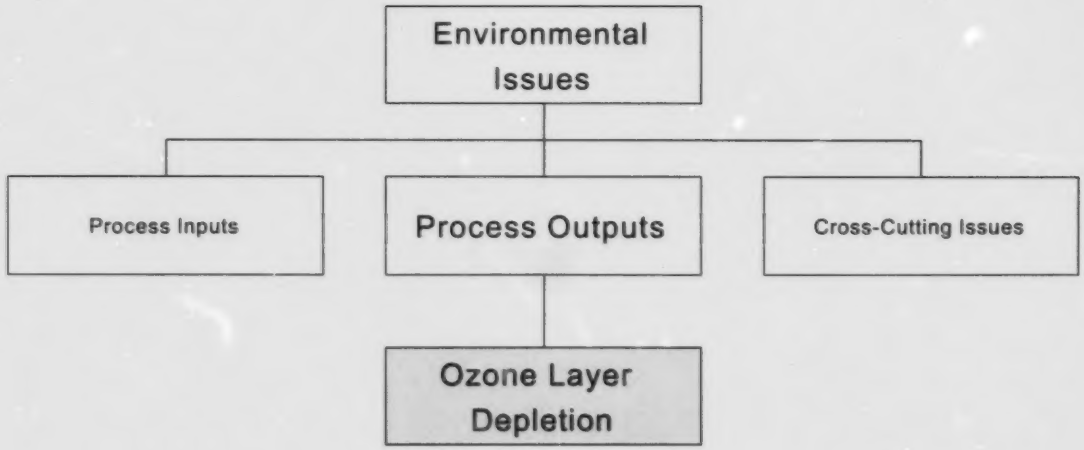
This module consists of 2 slides:

AP1	Title slide
AP2	Air Pollution

- The presentation on air pollution will address four topics:
  - Ozone layer depletion and climate change are global issues
  - Ground level ozone is a regional issue of particular concern in certain parts of the country
  - Local air pollution priorities include prevention of toxic releases, and such emissions-related concerns as odour and particulates.

Module 4:
Ozone Layer Depletion

OZONE LAYER DEPLETION



Issues

- Stratospheric Ozone Depletion Results in More Ultra Violet Light, Causing:
  - Skin cancer, cataracts
  - Animal and plant damage
- International Driver:

  Montreal Protocol on Substances that Deplete the Ozone Layer

Module 4 - Ozone Layer Depletion

This module consists of 9 slides:

OLD1	Title slide
OLD2	Issues overview
OLD3	Response to the issues
OLD4	Most affected activities - Refrigeration, Air Conditioning
OLD5	Most affected activities - Fumigation
OLD6	Most affected activities - Fire Suppression, Foam Packaging
OLD7	Legal requirements: federal
OLD8	National Ozone-Depleting Substance Control Schedule
OLD9	Legal requirements: provincial and territorial

- Depletion of the stratospheric ozone layer will result in higher levels of ultra-violet light penetrating to the earth.

- Higher UV levels have the potential to cause an increase in skin cancer and cataracts.

- Damage to plants and animals is also expected as a result of ozone depletion.

- Federal and provincial / territorial regulatory activity is framed by Canadian commitments under the Montreal Protocol on Substances that Deplete the Ozone Layer, and its amendments.

Response

- Regulation of ozone-depleting substances (ODS)
- Prohibitions, phaseouts, controls
- Research on substitutes

Most Affected Activities

- Refrigeration: *Chlorofluorocarbons (CFCs)*
  - Processors in dairy, meat, poultry and fish, fruit and vegetable, grocery products
  - Distribution, retail sales and food service
  - Commercial ice making
- Air Conditioning: *CFCs*
  - Work spaces, retail and food service

- The regulatory response entails control of identified ozone depleting substances.

- Controls can take the form of outright prohibitions, scheduled phaseouts with the use of transition chemicals, (as in the case of refrigerants), and controls on recovery, disposal and release to atmosphere of substances.

- Research into substitutes is also a priority of manufacturers, users and governments.

- All users of CFC-based refrigeration will be affected by regulatory changes. Ammonia-based refrigeration predominates in large industrial processing and storage facilities. Smaller facilities commonly use CFC, HCFC refrigeration systems.

- Processors, distributors and retailers will have the option after December 1995 of using recycled CFC, modifying equipment to use another refrigerant type [hydrochlorofluorocarbons (HCFC) or hydrofluorocarbons (HFC)], or replacing equipment.

- Users of CFC-based air conditioning will face similar decisions on maintenance, retrofit and replacement of equipment after December 1995.

Most Affected Activities (cont')

- Fumigation: *Methyl Bromide*
  - Grain, cereal, bakery, storage and processing
  - Pre-shipment and quarantine of grains and perishables

Most Affected Activities (cont')

- Fire Suppression: *Halon*
  - Non-essential uses eliminated
  - Portable extinguisher replacement
- Rigid Foam Packaging
  - Use of ODS prohibited

- Methyl bromide was regulated in December 1994 after stakeholder consultations.

- Restrictions on methyl bromide use will have the greatest non-agricultural impacts among industries which process grain, cereal, flour and products such as bakery goods. Methyl bromide is also used in pre-shipment and quarantine of grains, fruits and vegetables.

- Halons are another class of ozone depleting substance which were in wide use.

- In general, food and beverage processing, retail and service did not use halon flooding systems, but portable halon-filled extinguishers were common.

- Owners of portable extinguishers will be faced with replacement of equipment in some jurisdictions where refill with halons is banned. In others, refill can only be done with "old" halon, not manufactured after 1994.

- Alternative fire suppression technology is available.

- The use of ozone depleting substances in the manufacture of rigid foam used for food packaging was banned in 1990.

Legal Requirements: Federal

- Ozone-Depleting Substances Regulations
- Ozone-Depleting Substances Products Regulations
- Focus:
  - Controls on Import, Manufacture and Sale
  - Controls on Recovery, Recycle, and Disposal
  - Prohibition of Specific Uses

National Ozone-Depleting Substance Control Schedule

Ozone-depleting Substance	Scheduled Reduction in Consumption	Prohibition of New ODS (Import or Manufacture)
CFC's	Jan. 1994 to 25% of 1986 level	Jan. 1996
Halons		Jan. 1994
Carbon tetrachloride		Jan. 1995
Methyl chloroform	Jan. 1994 to 50% of 1989 level Jan. 1995 to 15% of 1989 level	Jan. 1996
HBFCs		Jan. 1996
Methyl bromide	Jan. 1995 limited to 1991 level Jan. 1998 to 75% of 1991 level	

- Federal regulations under the Canadian Environmental Protection Act address the use of ozone-depleting substances and products containing ozone-depleting substances.

- The import, manufacture and sale of specified ODS and ODS products are prohibited.

- Certain ODS can only be used if they have been recovered from another use and recycled.

- Atmospheric releases of ODS are prohibited.

- Specific uses of ODS are banned, such as non-medical use of propellants and in the manufacture of rigid packaging foam.

- This is the schedule for control and phaseout of specific ozone-depleting substances required by federal regulation.

- Provincial control and phaseout schedules may differ in the materials and activities covered.

Legal Requirements: Provincial and Territorial

- Ozone-depleting Substances Regulations
  - Prohibitions and Phaseouts
  - Technician Certification, Equipment Performance
  - Labels, Records
  - ODS Recovery, Equipment Disposal

- Provincial and territorial regulations are harmonized with the federal regulatory plan for ODS.

- There are differences among jurisdictions; for example, Ontario has been first to ban most HCFCs for use in fire extinguishing as of January 1996. HCFC is a transition chemical used as a refrigerant and in other applications. It is also an ozone depleting substance, but with lower potency than CFCs.

- Provincial and territorial regulations prohibit and control specified substances and place requirements on service technician training, on equipment performance and maintenance.

- Regulations also specify record-keeping and labelling requirements, require capture of ODS from equipment, and certification that equipment is empty before disposal.

Supplementary Information:
Ozone Layer Depletion

OZONE LAYER DEPLETION

ENVIRONMENTAL ISSUES:

Stratospheric ozone absorbs ultraviolet radiation from the sun and infrared radiation reflected from earth. Thinning or depletion of the ozone layer is attributed to the release of certain industrial chemicals which catalyse the destruction of ozone in the atmosphere.

Depletion of stratospheric ozone, is expected to cause an increase in the amount of mid-energy (UV-B) ultraviolet light reaching the surface of the earth. Higher levels of UV-B can cause an increase in skin cancers and eye injury, notably cataracts in humans. Some plant and animal species are sensitive to ultraviolet light; increased levels of UV light may present a risk to these species and to others dependent upon them. There is great uncertainty about the possible effects of increased UV-B on ecosystems. Aquatic ecosystems are considered to be at risk of disruption from increased UV-B radiation.

Stratospheric ozone contributes to global warming. Ozone layer depletion may result in climate change, but the nature and extent of change cannot be predicted with certainty.

INTERNATIONAL AGREEMENT:

The Montreal Protocol on Substances that Deplete the Ozone Layer and amendments to the protocol.

RESPONSE TO REDUCE THE ENVIRONMENTAL EFFECT:

The production, import, use and release of chemicals identified as ozone-depleting substances (ODS) is being phased out in Canada. The most significant uses of these chemicals in the agri-food industry are in refrigeration, air conditioning and fumigation for pest control. Of lesser importance to the agri-food industry is the use of ODS in fire extinguishers, in cleaning solvents and in the manufacture of insulating foam. Use of ODS in packaging material and non-essential uses as propellants have been terminated.

AGRI-FOOD INDUSTRY SECTORS MOST AFFECTED:

Refrigeration and air conditioning:
Agri-food sectors which require chilling for food processing or preservation or space conditioning are affected. Sectors which use ice for chilling are affected. Equipment using a chlorofluorocarbon (CFC) refrigerant may be recharged after

January 1, 1996 only with recovered and recycled CFC, or, after equipment modification, with another class of refrigerant (hydrochlorofluorocarbon - HCFC or hydrofluorocarbon - HFC). ODS legislation may accelerate replacement of refrigeration and air conditioning equipment with new equipment which does not use ODS refrigerant.

Ammonia-based refrigeration predominates in large food processing plants in the meat, fish, dairy, fruit and vegetable and brewing sectors, but smaller establishments in these sectors use CFC and HCFC refrigeration systems.

Fumigation:
Processors of domestic grain and cereals for domestic consumption using methyl bromide as a space and commodity fumigant will be affected by a cap on consumption of methyl bromide to 1991 levels. Use of methyl bromide for pre-shipment and quarantine purposes is not limited to 1991 levels but importation of methyl bromide for such use will be controlled by permit.

Fire Extinguishing:
Halon flooding systems were not typically used in food processing or service industries. Non-essential new uses of halons were eliminated by January 1, 1994. Only recovered halon may be used to recharge existing fire-extinguishing systems. Some types of halons, recycled or new, can no longer be used in fire extinguishing equipment.

REGULATORY REQUIREMENTS:

Canada
Ozone-depleting Substances Regulations, as amended
Ozone-depleting Substances Products Regulations, as amended

Federal legislation specifies phaseout schedules for manufacture, import, use and reuse of ozone-depleting substances. The regulations also establish a permit system and rules for allocation of production and consumption of these controlled substances.

National ODS Control Schedule

Ozone-depleting Substance	Control Schedule
CFCs	Jan 1994 75% reduction from 1986 Jan 1996 elimination of new chemical
Halons	Jan 1994 elimination of new chemical

Carbon tetrachloride	Jan 1995 elimination of new chemical
Methyl chloroform	Jan 1994 50% reduction from 1989 Jan 1995 85% reduction from 1989 Jan 1996 elimination of new chemical
HBFCs	Jan 1996 elimination of new chemical
Methyl bromide	Jan 1995 limited to 1991 level Jan 1998 25% reduction from 1991

Provinces and Territories

All jurisdictions except the Yukon and Northwest Territories and Newfoundland have legislation in effect regarding ozone-depleting substances. Regulations are being drafted in those jurisdictions.

Provincial/territorial legislation is harmonized with federal phaseout schedules and prohibitions for ODS, but there are some differences in the regulations among provinces. The following are some typical provisions:

For refrigerants, atmospheric releases of ODS during equipment operation, servicing, and leak testing are prohibited. Service technicians must be trained and certified. Refrigeration and refrigerant extraction equipment must meet performance standards.

For all controlled substances, there are labelling and record-keeping requirements. Collection, recycling, storage and disposal of ODS is regulated. Equipment must be certified empty of ODS prior to disposal in some provinces.

Municipal

Many municipalities require certification that ozone-depleting substances have been extracted from refrigeration, air conditioning, and fire extinguishing equipment before equipment is accepted at a waste disposal site.

VOLUNTARY ACTION:

The Halon Bank, managed by Underwriters Laboratories of Canada, lists supplies of reconditioned halons in Canada, service companies, and maintains an information service on halons, ODS regulations, and fire extinguishing systems.

Research on substitute refrigerants is being conducted in Canada by the National Research Council in co-operation with the Air Conditioning and Refrigeration Institute.

INDUSTRY PERFORMANCE:

National and global indicators relating to ozone layer depletion have been developed by Environment Canada. No industry-specific data have been located that would serve as the basis for developing an indicator of industry performance in reducing the release of ozone-depleting substances. The import, production and use of ODS are highly regulated, and the agri-food industry performance can be considered to meet the regulatory

requirements.

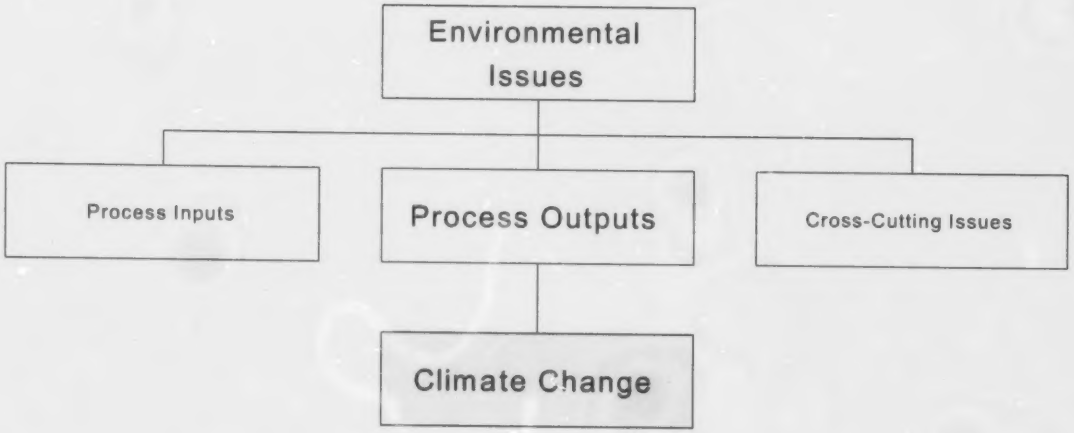
FUTURE CONSIDERATIONS:

Parties to the Montreal Protocol will consider in December adoption of a revised phase out schedule of HCFCs for developed countries. HCFCs are used now as a fire extinguishant and as a transition chemical in refrigeration. Ontario has prohibited most HCFCs in fire extinguishing uses as of January 1996 and HCFCs used in vehicle air conditioning systems are being phased out starting in December 1995.

Also in December, parties to the Montreal Protocol will consider adoption of a phase-out schedule for methyl bromide. The planned halt of American methyl bromide production in 2001 may accelerate substitution efforts in Canada, as no methyl bromide is produced domestically.

Module 5:
Climate Change

CLIMATE CHANGE



Issues

- Buildup of Greenhouse Gases Causing:
  - Warming of the earth's atmosphere
  - Dramatic climate and land use change
- International Driver:
  - Framework Convention on Climate Change

Module 5 - Climate Change

Note to presenters:

This module consists of 9 slides:

CC1 Title slide
CC2 Issues overview
CC3 Response to the issues
CC4 Most affected activities
CC5 Legal requirements: provincial / territorial
CC6 Voluntary action - National Action Program on Climate Change
CC7 Voluntary action - other
CC8 Voluntary action - Ontario
CC9 Business opportunities

- Global warming and climate change are national and international priorities.

- The term "global warming" refers to the gradual increase in temperature of the earth's atmosphere caused by increasing concentrations of greenhouse gases produced by human activity.

- Significant changes in weather patterns, climate and land use are predicted if a temperature rise occurs.

- The international agreement which is the basis for Canada's national program is the Framework Convention on Climate Change.

Response

- Reduce Greenhouse Gas Emissions
- Greenhouse Gases (GHG):
  - Carbon dioxide, Nitrous oxide, Methane, Chlorofluorocarbons (CFCs)
- Focus:
  - Increase energy efficiency
  - Reduce fossil fuel combustion
  - Eliminate CFC's

Most Affected Activities

- Transportation
  - Trucking energy efficiency, fleet maintenance, alternative fuels
- Energy intensive processing
  - Meat and poultry, dairy, animal feed, brewery
  - Roasting, rendering, cooking, cleaning, refrigeration
- Other
  - Fermentation CO_2, anaerobic

- The goal of action programs on climate change is to reduce net emissions of greenhouse gases.

- The main greenhouse gases produced by human activity are carbon dioxide, nitrous oxide, methane, and CFCs. Carbon dioxide and methane have significant natural sources of emission as well.

- Carbon dioxide accounts for 80% of Canada's greenhouse gas emissions and most carbon dioxide is released in combustion of fossil fuels.

- The primary focus for carbon dioxide reduction is on better energy efficiency and reduced fossil fuel combustion.

- Chlorofluorocarbons, or CFCs, which are used extensively in refrigeration, are being phased out under legislation intended to reduce ozone layer depletion. They will be discussed in the section on ozone depletion.

- Improved energy efficiencies will be required throughout Canadian industry.

- The transportation sector accounts for more than 30% of carbon dioxide emission in Canada and is therefore a focus for emission reductions.

- Trucking fleets will need to have better energy efficiency, requiring a higher level of maintenance of existing fleet and energy conscious purchases of new equipment.

- The federal government is also placing a priority on development of cleaner-burning alternative fuels, including ethanol from biomass to reduce greenhouse gas emissions.

- Efforts to reduce energy consumption may be expected in energy intensive industry sectors and processes, including:

    - Meat and poultry, dairy, animal feed, brewery
    - Roasting, rendering, cooking, baking, refrigeration

- Other minor sources of greenhouse gas emissions from the agri-food sector include carbon dioxide from fermentation and methane from

anaerobic decomposition of organic wastes.

Legal Requirements: Provincial and Territorial

- British Columbia
  - Air Care light duty vehicle testing
  - 113,000 tonne GHG reduction

Voluntary Action

- National Action Program on Climate Change
- Goal:
  - Greenhouse gas stabilisation to 1990 levels by 2000
- Emphasis on voluntary, not regulatory approach

- Few regulations deal directly with greenhouse gas reductions at this time.

- Mandatory light duty vehicle emissions testing and resulting maintenance and repairs in the BC lower mainland through the Air Care program are credited with greenhouse gas reductions of 113,000 tonnes.

- Similar vehicle emission testing programs may be introduced elsewhere

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- The National Action Program on Climate Change has as a goal the stabilisation by 2000 of greenhouse gas emissions to 1990 levels.

- The emphasis in the National Action Plan is on voluntary, not regulatory measures.

Voluntary Action (cont')

- Corporate Voluntary Climate Change Challenge and Registry
- Canadian Industry Program for Energy Conservation
- Municipal 20% Club - GHG reductions by 2005

Voluntary Action (cont')

- Ontario
  - Green Community Initiatives
  - Green Industrial Analysis and Retrofit
  - ORTEE Collaborative on Transporation and Climate Change
- Utility company energy audits, assistance
- Provincial government energy audits, assistance

- Part of the federal National Action Plan, the Voluntary Climate Change Challenge was initiated in September 1994 to enlist support of corporations and organisations in achieving greenhouse gas emission reductions. Details of the Challenge remain to be finalized, but participants will form action plans and report progress in achieving reductions.

- The Canadian Industry Program for Energy Conservation, CIPEC, is a voluntary initiative of industry, supported by government. It promotes and monitors energy efficiency in different industrial sectors. The food and beverage industries are scheduled for inclusion in 1995 in data collection and analysis on energy use.

- Several Canadian municipalities, linking to international community programs, have committed to reducing greenhouse gas emissions by 20% by the year 2005. The scope of these programs can be broad and industry participation in these community-based programs is expected.

- In Ontario, the Green Community Initiatives involve partnerships with industry and other community members to increase energy and water efficiency and prevent pollution.

- The Green Industrial Analysis and Retrofit program is a cost-sharing program for industrial audits and retrofits to reduce energy and water use and waste production.

- The Ontario Round Table on the Environment and Economy has undertaken a collaborative on transportation, focussing on carbon dioxide reductions.

- Several utility companies and provincial governments offer industries assistance with energy audits and plans to reduce consumption

Business Opportunities

- Energy cost savings
- Collateral savings - water
- Technology development
- Energy service company financing

- Carbon dioxide emissions can be effectively reduced by lowering energy consumption.

- Direct savings from reduced energy costs can be augmented by collateral savings in water usage through heat recovery and water recycling.

- Pollution prevention can drive the development or implementation of new technologies such as energy process integration (PINCH), and new heating technologies for food processing.

- Financing of energy efficiency improvements can be facilitated through energy savings achieved in arrangements with energy service companies.

Supplementary Information:
Global Warming / Climate Change

GLOBAL WARMING / CLIMATE CHANGE

ENVIRONMENTAL ISSUES:

Scientists have predicted an average increase in global temperature of two to five centigrade degrees in the next century if the trend of increasing emissions of greenhouse gases is not reversed. This global warming is expected to provoke dramatic changes in land use, sea levels, weather patterns, and may have profound effects on human society and all living things.

Greenhouse gases warm the atmosphere by absorbing infrared radiation reflected from the earth's surface. These gases occur naturally and are also produced as a result of human activity. Other than water vapour, the most important gases are carbon dioxide, nitrous oxide, methane, and chlorofluorocarbons (CFCs).

Carbon dioxide, accounting for 80% of Canadian greenhouse gas emissions, is essentially all produced as a result of fossil fuel combustion for energy conversion. The other greenhouse gases mentioned above are not as abundant as carbon dioxide, but are more potent in their warming effect.

Global deforestation also contributes to the warming trend as the loss of forests reduces the earth's capacity to sequester carbon dioxide in growing trees.

INTERNATIONAL AGREEMENT:

The Framework Convention on Climate Change

RESPONSE TO REDUCE THE ENVIRONMENTAL EFFECT:

The Canadian Council of Ministers of the Environment has endorsed a National Action Program on Climate Change, which comprises a number of strategies and actions intended to reduce net greenhouse gas emissions. The goal of the action plan is to stabilize greenhouse gas emissions at 1990 levels by 2000. At present, the emphasis is on voluntary measures.

The principal goal of the action plan is reduction of carbon dioxide emissions through better energy efficiency and reduced fossil fuel consumption. Three important areas for improvement of industrial energy efficiency are industrial processing, building operations, and transportation. Strategies are in place or in development for each of these activities.

CFCs, which are several thousand times more potent greenhouse gases than carbon dioxide, are also a chief cause of stratospheric ozone depletion. They are being phased out of usage. Further information can be found in the brief entitled

"Ozone Layer Depletion."

AGRI-FOOD INDUSTRY SECTORS MOST AFFECTED:

In comparison to energy-intensive natural resource, metallurgical and chemical industries, the agri-food industry consumes a small proportion of national industrial energy. Nevertheless, as a major manufacturing group, it will be expected to reduce energy consumption and greenhouse gas emissions.

Improvements to transportation efficiency and the trucking industry in particular will affect the agri-food industry as a service user and owner of trucking fleets. Better fuel efficiency will help to offset increased maintenance costs and equipment modifications. A national strategy to promote alternative transportation fuels, including ethanol from biomass may also be a factor in fleet operations and equipment choice.

Industry sectors which consume the largest amounts of energy for processing will be most affected by conservation programs. Included in this group are meat and poultry, dairy, animal feed and brewery. Energy intensive processing activities such as rendering, roasting, cooking and baking may also be targetted for improvement.

Users of CFC-based refrigeration will be affected by phase-out legislation for ozone-depleting substances.

The agri-food industry is directly and indirectly the source of methane releases from anaerobic decomposition of organic matter such as food industry wet wastes. Some landfill operations and closed vessel digestion systems extract methane and use it as a fuel. Fermentation carbon dioxide, captured for use in some large breweries is another minor source of greenhouse gases.

REGULATORY REQUIREMENTS:

There are few regulations which deal directly with greenhouse gas reductions at this time.

In British Columbia, mandatory light duty vehicle testing in the lower mainland has been credited with greenhouse gas emissions of 113,000 tonnes. BC is considering a recommendation to expand mandatory testing to include transport trucks.

Federal and provincial energy efficiency legislation which sets standards for equipment performance will impact some sectors. For example, Ontario has proposed new energy efficiency standards for commercial ice-making and storage equipment.

VOLUNTARY ACTION:

Several strategies and actions under the National Action Plan for Climate Change are in development. One strategy, the Voluntary Challenge and Registry encourages companies and industry groups to make a commitment to emissions reductions and to allow public scrutiny of results.

The Canadian Industry Program for Energy Conservation, CIPEC, is a voluntary initiative of industry, supported by government. It promotes and monitors energy efficiency in different industrial sectors. The food and beverage industries are scheduled for inclusion in 1995 in data collection and analysis on energy use.

Several Canadian cities are participating in an international program of local environmental initiatives. These cities have undertaken a 20% reduction in greenhouse gas emissions by 2005 from 1990 levels. Activities are not restricted to municipal operations, but may include residential, industrial, commercial and institutional sectors.

Several utility companies and provincial governments offer industries assistance with energy audits and plans to reduce consumption. Financing of energy efficiency improvements can be facilitated through energy savings achieved in arrangements with energy service companies.

In Ontario, The Green Communities Initiatives foster industry participation in reductions of energy and water consumption and pollution prevention in support of community goals. The Green Industrial Analysis and Retrofit program provides funding on a cost-shared basis for industrial audits and retrofits to reduce energy and water use and waste production. The Ontario Round Table on the Environment and Economy has recently announced a collaborative on transportation which will focus on carbon dioxide reductions.

BUSINESS OPPORTUNITIES

Greenhouse gas emission reductions will result primarily from reduced consumption of fossil fuels, achieved through improved energy efficiency and changes to alternate fuel and energy sources. Cost savings will be a direct result of decreased energy consumption. Energy savings may have collateral benefits in, for example, reduced water usage gained through heat recovery and water recycling. The need to improve energy efficiency will promote development of new technology and may result in new market opportunities.

INDUSTRY PERFORMANCE

The proposed indictor of industry performance is carbon dioxide emissions, which is derived from energy consumption, accounting for fuel type. These data are taken from information provided

through a CIPEC database. Other greenhouse gases, CFCs in particular, contribute to the impact of agri-food on global warming but industry-specific data on these emissions are not available.

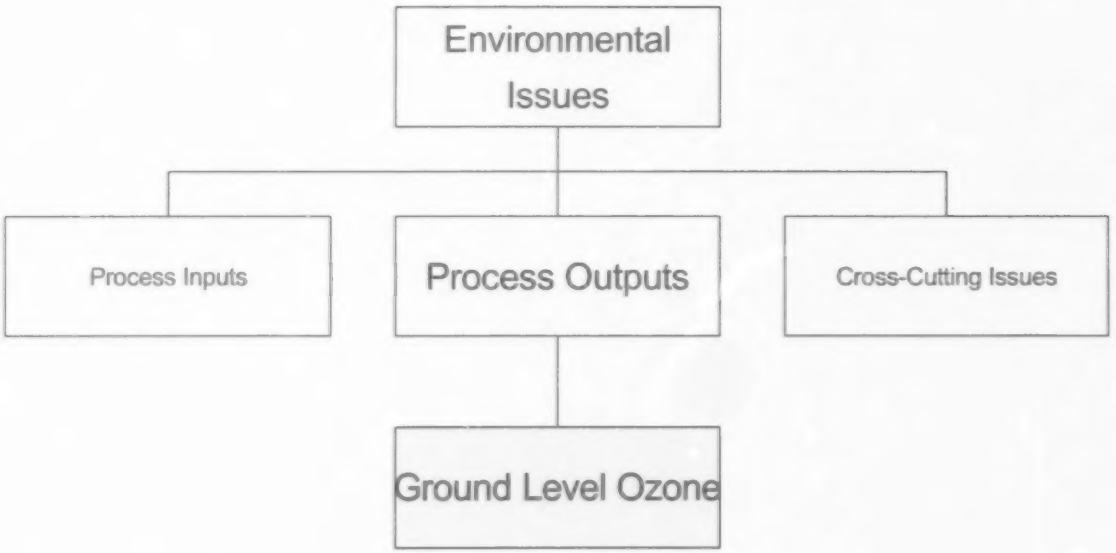
FUTURE CONSIDERATIONS

The current emphasis by government on voluntary reductions of greenhouse gases provides businesses with an opportunity to achieve reductions of their choosing. Success in achieving voluntary reductions may reduce the need for regulation.

Energy efficiency standards introduced for transportation, buildings, equipment will affect the industry over the next several years.

Module 6:
Ground Level Ozone

GROUND LEVEL OZONE



Issues

- Urban smog
- Human health, respiratory health
- Crop damage
- Caused by Reaction of Volatile Organics and Oxides of Nitrogen

Module 6 - Global Warming

Note to presenters:

This module consists of 6 slides:

GLO1	Title slide
GLO2	Issues overview
GLO3	Response to the issues
GLO4	Most affected activities
GLO5	Legal requirements: Provincial and Territorial
GLO6	Voluntary action - CCME NOx/VOC Management Plan

- Ground level ozone is created in a chemical reaction between volatile organic chemicals and nitrogen oxides in the presence of sunlight.

- This ozone contributes to urban smog, increases risk to human health, particularly respiratory health, and is thought to have potential for plant and crop damage.

Response

- Reduce volatile organic chemical (VOC) emissions
- Reduce oxides of nitrogen (NOx) emissions
- Areas of Greatest Concern
  - Lower Fraser Valley
  - Windsor-Quebec Corridor
  - Southern Atlantic Region

Most Affected Activities

- Transportation fleet maintenance
- Bulk storage of VOCs
- Packaging design for low-VOC inks, coatings, foam
- Boiler modifications to low NOx
- Natural oil extraction - 10 ktonne VOC annually; bakeries - 2.3 ktonne VOC annually

- The focus of regulatory and voluntary initiatives to reduce ground level ozone is on the reduction of the precursor chemicals:
  - Volatile organic chemicals (VOCs), typically in fuels and solvents; and
  - Oxides of nitrogen, NOx, formed in high temperature combustion.
- Three areas of greatest concern have been identified in Canada:
  - Lower Fraser Valley
  - Windsor-Quebec Corridor
  - Southern Atlantic Region

- The initiatives to control VOC and NOx emissions should not place excessive demands on the agri-food industries.
- Truck and vehicle fleet maintenance may be the most important area for achieving VOC and NOx reductions.
- VOC emissions from printing and coating of all types of packaging material and from manufacture of packaging foam are targets for reductions.
- The Canadian Council of Ministers of the Environment has an initiative to reduce NOx emissions from commercial and industrial boilers.
- Although not targeted in a VOC reduction initiative, the single largest source of VOC emissions identified in food processing is the natural oil extraction sector, emitting 10 kilotonnes annually, followed by bakeries at 2.3 kilotonnes.

Legal Requirements: Provincial and Territorial

- BC AirCare light duty vehicle testing
- Provincial strategies in development

Voluntary Action

- CCME NOx / VOC Management Plan
- VOC reductions in
  - Solvents to make foam packaging
  - Printing and Coating (packaging)
  - Bulk storage of VOC (fuels, solvents)
- NOx reductions in
  - Industrial boilers

- One NOx / VOC regulatory requirement in provincial legislation is vehicle emission testing in the British Columbia lower mainland for vehicles under five tonnes gross vehicle weight.

- BC may extend testing to heavy duty vehicles and testing programs may be implemented in other parts of Canada as provincial air quality strategies are developed.

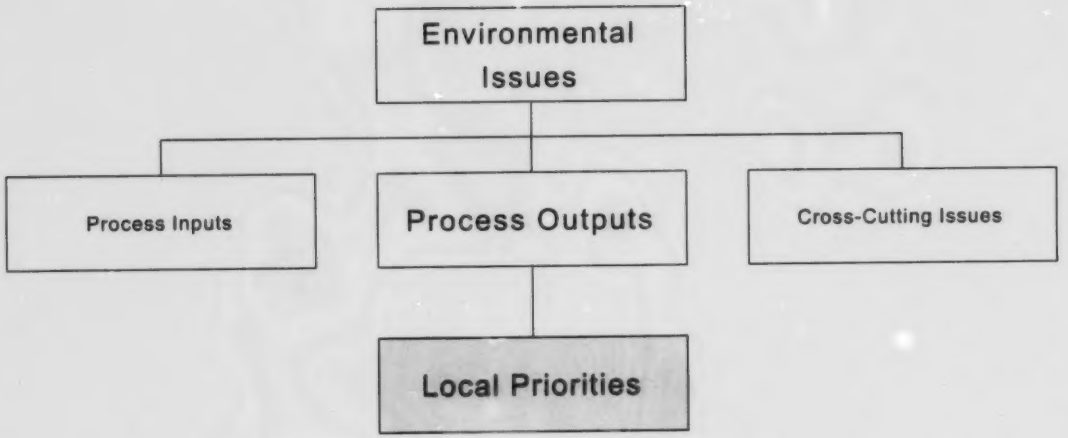
- The CCME NOx / VOC Management Plan includes a number of initiatives and standards to reduce emissions from specific activities or types of equipment. Some of these initiatives have taken the form of guidelines or codes of practice for industry sectors or activities.

- Some of the reduction initiatives in place now may have agri-food industry impacts in packaging, bulk storage of volatile organics such as fuels and solvents, and in industrial boiler operations.

Module 7:
Air Pollution -- Local Priorities

AIR POLLUTION

LOCAL PRIORITIES



Issues

- Prevention of toxic releases
- Enjoyment and use of property
- Key Parameters
  - Odour, particulate, visible emissions

Module 7 - Air Pollution -- Local Priorities

Note to presenters:

This module consists of 5 slides:

APL1	Title slide
APL2	Issues overview
APL3	Most affected sectors
APL4	Legal Requirements - provincial / territorial
APL5	Legal requirements - municipal

- The key air pollution issues related to local effects are prevention of the release of toxic substances, and the community's right to enjoyment and use of their property.

- For the agri-food industry, the key parameters are odour, particulate and visible emissions.

Most Affected Sectors

- Every emission source may require a permit to discharge
- Odour an issue for
  - Fish, meat, poultry, starch, coffee, rendering,waste treatment lagoons
- Particulate and visible emissions an issue for
  - Grain handling, oil seed crushing, powdered milk

Legal Requirements: Provincial and Territorial

- Regulations under Air Quality Act or general Environmental Protection Act

- Basis for permits
  - Air quality objectives
  - Point of impingement concentration
  - Point of exhaust concentration
  - Normal use and enjoyment of neighbouring property

- The prohibition against discharging contaminants to the atmosphere without a permit applies to industrial, commercial and institutional sources of emissions.

- Odour is a cause of community complaints for several food processing industries, among them: fish, fish meal, meat, and poultry processing plants, starch, coffee roasting, and rendering plants. Plants with sewage treatment to reduce biological oxygen demand may also produce objectionable odours.

- Compliance with limits for particulate and visible emissions is important for industries processing grains such as flour mills, breweries, and distilleries, processors of oil seeds, and producers of dried powders such as milk.

- Regulation of air pollution is chiefly a provincial and territorial responsibility.

- Emission of contaminants to the atmosphere is generally prohibited unless allowed under the conditions of an authorization or permit.

- Limits for the concentration of substances may be specified at the point of exhaust, or, as in Ontario, at the nearest point of impact off the property of the generator.

- Odour and particulate emissions, key parameters for the agri-food industry, may affect the normal enjoyment of property by the surrounding community.

Legal Requirements: Municipal

- Authority can transfer to municipalities

- Greater Vancouver
  - GVRD Air Quality Management Bylaw - permits for emissions

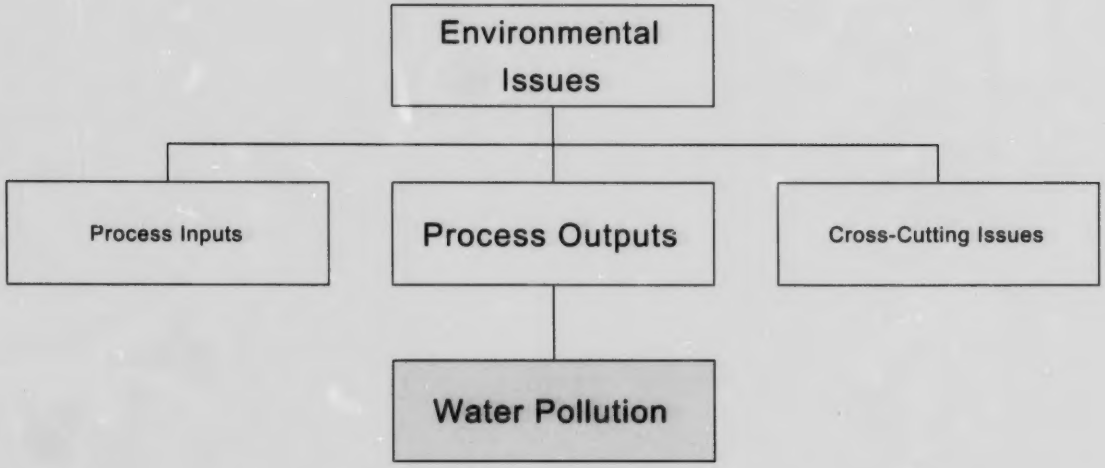
- Montreal Urban Community
  - By-Law 90 gives MUC all powers over air quality and pollution reduction agreements

- Municipalities in some jurisdictions have been given authority over issuing permits for air emissions and monitoring compliance.

- The Greater Vancouver Regional District and the Montreal Urban Community are two examples of this transfer of responsibility.

Module 8:
Water Pollution

WATER POLLUTION



Issues

- Water quality protection
- Human and ecosystem health
- Economic importance
- Recreational, cultural and social values

Module 8 - Water Pollution

Note to presenters:

This module consists of 9 slides:

WP1	Title slide
WP2	Issues overview
WP3	Response to the issues
WP4	Most affected sectors
WP5	Legal requirements - federal
WP6	Legal requirements - provincial / territorial
WP7	Legal requirements - municipal
WP8	Voluntary action - Ontario
WP9	Business opportunities

- Abundant clean water plays a key role in Canadian life.
- Human and ecosystem health are dependent on clean water.
- Canadian industry requires reliable supplies of clean water, for process water, cooling water and for raw material in food and beverage products.
- Finally, clean water has significant recreational, cultural and social value.

Response

- Regulation of contaminant discharges
- Numerical limits, process-based, or best achievable technology
- Process control, end of pipe treatment
- Key Parameters
  - Biological Oxygen Demand, Suspended Solids, Grease & Oil, Total Nitrogen, pH

Most Affected Sectors

- All plants discharging to sewer or directly to water
- Primary food processors and high water users
  - Meat, Poultry, Fish, Fruit and Vegetable Processing
  - Dairy, Breweries, all Beverages

- The response to water quality impairment has been prevention of release of harmful quantities of contaminants through regulation of effluent quality.

- Industry has responded with process controls to reduce the quantity of effluent, to remove contaminants, and with installation of effluent treatment to improve effluent quality.

- Discharges may be specified by concentration limits, or they may be set relative to the level of production at the facility which is discharging.

- For some industries, regulation may require that best achievable technology be implemented at the plant to reduce the amount of pollutant released.

- The key parameters for the food and beverage processing, retail and service industries are biological oxygen demand (BOD), suspended solids, grease and oils, and total nitrogen. Control of pH is a concern for some sectors.

- All facilities discharging to sewer or directly to a water course will require a discharge permit and may be subject to monitoring or control requirements.

- The agri-food industry sectors most affected by a need for water pollution abatement are the primary food processors and heavy water users such as meat, poultry and fish processors, the fruit and vegetable processing sector, as well as dairy, breweries and other beverage processors.

Legal Requirements: Federal

- Fisheries Act - applies to direct dischargers
  - Meat, Poultry, Potato Processing Plant Regulations (scheduled for repeal in 1995)
  - Prohibition of discharge of deleterious substances

Legal Requirements: Provincial and Territorial

- Water pollution regulations under a Water Quality Act or general Environmental Protection Act
- Approval for discharges
- Spill reporting required

- Regulation of discharges to water bodies is chiefly a provincial matter, but under the federal Fisheries Act, there are regulations for meat, poultry, and potato processing plants. These regulations, however, are scheduled for repeal in 1995.

- Under the Fisheries Act, there is a general prohibition against the discharge of deleterious substances. This prohibition could have wide application to direct dischargers of effluent.

- The provinces and territories regulate discharges to water through a Water Quality Act or general Environmental Protection legislation.

- All discharges of contaminants to a water body are typically prohibited unless approved in a permit issued by the province or territory.

- Permit holders are required to comply with permit conditions and report any spills.

Legal Requirements: Municipal

- Sewer use bylaws for dischargers to sewer
- Limits, prohibitions, surcharges

Voluntary Action: Ontario

- Green Industry Analysis and Retrofit - funding for plant audits and retrofits for wastewater treatment
- MOU with food and beverage processors
- Best management practice guide for restaurants

- Many food and beverage processors, most retailers and restaurants discharge to a municipal sewer.

- Municipal sewer use bylaws may require users to obtain a discharge permit, and may limit discharge amounts of the key parameters previously mentioned.

- If limits on certain substances (e.g., suspended solids or biological oxygen demanding matter) are exceeded, the municipality may levy surcharges. These surcharges can be a significant cost to food and beverage processors.

- In metro Toronto, 80% of the highest-surcharged establishments are food and beverage processors with annual surcharges ranging up to one million dollars for a single plant.

- National and international voluntary water pollution prevention initiatives tend to be concentrated on other industry groups and on toxic substances not encountered in the agri-food sector.

- In Ontario, the Green Industry Analysis and Retrofit program provides funding on a cost-shared basis for plant audits and also for retrofits to reduce energy and water consumption and for wastewater treatment.

- Other activities include a memorandum of understanding on pollution prevention with food and beverage processors to reduce fat, oil and grease discharges, and development of a best management practices guide for restaurants this year.

Business Opportunities

- Value from waste
  - By-products from concentrated effluent
  - Liquid animal feed supplement
- Costs avoided
  - Purchased water costs reduced
  - Municipal sewer surcharges reduced

- Valuable products and by-products can be recovered from effluent.

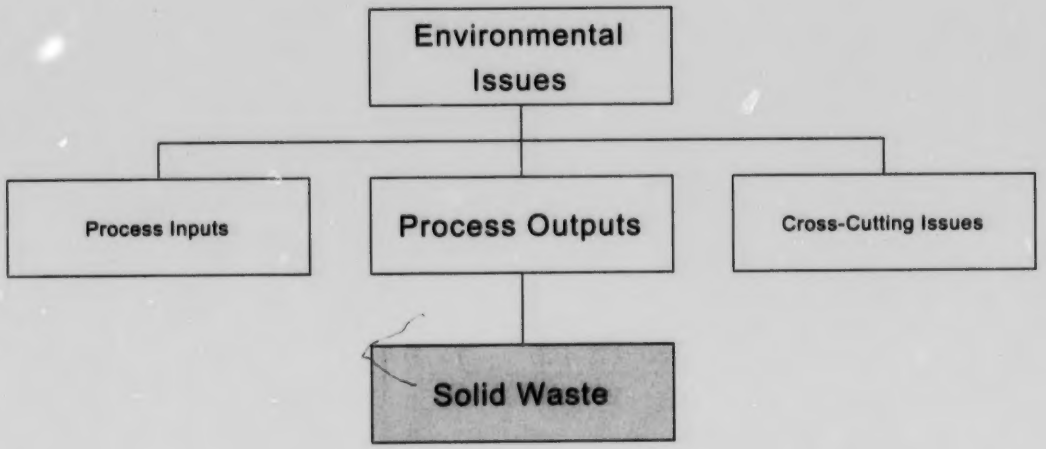
- In dairies, for example, membrane technology can be used to remove dairy fat from process water. Effluent can be concentrated to recover whey, which can be sold.

- Dairy effluent is also used as an animal feed supplement.

- Reducing water consumption through cleaning and recycling can reduce water costs and municipal sewerage surcharges.

Module 9:
Solid Waste

SOLID WASTE


Environmental Issues
Process Inputs
Process Outputs
Cross-Cutting Issues
Solid Waste

Issues

- Urban Landfill Constraints
- Wasted Material & Energy Resources
- Costs of Waste Management

Module 9 - Solid Waste

This module consists of 11 slides:

SW1	Title slide
SW2	Issues overview
SW3	Response to the issues
SW4	Most affected sectors
SW5	Legal requirements - total solid waste
SW6	Legal requirements - total solid waste - Ontario
SW7	Legal requirements - beverage container regulation
SW8	Voluntary action - packaging waste - NAPP
SW9	Voluntary action - packaging waste - CIPSI
SW10	Voluntary action - wet waste
SW11	Business opportunities

- The environmental burden of solid waste was declared a national priority in the 1990 Green Plan.
- Landfill sites near some major Canadian urban centres will close soon.
- Siting of new landfill space near major urban centres is difficult, costly, time-consuming.
- Solid waste represents a loss of resources - material resources, energy, labour, and other.
- Waste management costs are rising.
- Higher tipping fees provide incentive for waste diversion.

Response

- Waste Reduction Strategy Objectives:
  - 50% Overall Reduction by 2000
  - Voluntary Approach
- Special Reduction Targets
  - Packaging Waste
  - Beverage Containers

Most Affected Sectors

- Packaging Waste
  - Largest amount of packaging waste to disposal: fruit and vegetable, soft drinks, retail grocery
  - Least amount of Packaging waste to disposal: bakery, brewery, distillery, winery
- Beverage Containers
  - Producers, distributors, retailers

- The Canadian Council of Ministers of the Environment (CCME) set a target for Canada of a 50% reduction of all solid waste going to disposal sites by 2000, using 1988 as a base year.

- The government endorses the many Rs hierarchy of reduce, reuse, recycle, recovery, residuals disposal, and remediation to achieve waste minimization.

- The preferred approach is preventive and voluntary, not regulatory.

- Packaging waste has been identified as a special waste category for 50% reduction

- National Packaging Protocol, endorsed by the CCME, is the focus for packaging waste reduction.

- Beverage containers have been identified as a special target for regulation in provincial and territorial legislation

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- All sectors of Canadian society are expected to achieve waste reductions.

  - Every sector is expected to achieve a packaging waste reduction of 50%.
  - The agri-food industry is participating in solid waste reduction programs, both voluntary and mandatory.

- In 1992, the largest amounts of packaging waste were sent to disposal by these industry sectors:
  - fruit and vegetable, soft drinks, retail grocery

- In 1992, the least amounts of packaging waste were sent to disposal by these industry sectors:
  - bakery, brewery, distillery and winery

- Beverage container regulations place requirements on beverage processors, distributors and retailers in each province and territory.

Legal Requirements: Total Solid Waste

- Municipal
  - Landfill bans on special materials
- Provincial/Territorial
  - New laws to reach 50% reduction by 2000
- In 1994
  - Quebec LQE amendments
  - Manitoba WRAP
  - Ontario 3Rs regulations

Legal Requirements: Total Solid Waste (cont')

- Ontario 3Rs Regulations, 1994

- Food & Beverage Manufacturing
  - Packaging Audits and Reduction Plan

- Manufacturing, Retail, and Food Service
  - Waste Audits and Reduction Plan
  - Source Separation of Recyclables

- Municipal and regional governments may impose bans on certain materials. Corrugated cardboard is a commonly excluded material; however its current market value is a significant waste diversion incentive.

- Many provinces have begun the process of creating enabling legislation to address solid waste issues, chiefly packaging, and to issue regulations in support of a national objective of 50% waste reduction.

- Legislative activity in 1994 in three of the provinces is illustrative:

  - In Quebec, the Environmental Quality Act, LQE, was amended to provide for regulation of packaging reduction, recovered material content, and package labelling.
  - In Manitoba, the Waste Reduction and Prevention (WRAP) Act and Regulation designates materials for which a levy may be charged to support multi-material collection and recycling. A two cent levy is now charged on beverage containers which are not refillable.
  - In Ontario, the 3 R's regulations place requirements for waste reduction on municipalities and industrial, institutional and commercial waste generators.

- For Industrial, Commercial and Institutional waste generators, Ontario 3R's regulations apply if the business is located in a municipality with a population greater than 5,000 and if the business is larger than a specified size.

- Packaging audits and reduction plans are required of companies that manufacture, package or import packaged food.

- Waste audits and reduction plans are required of manufacturers, retailers, institutions, and restaurants.

- Source separation requirements are regulated for each type of business and depend on the business type.

- Some wastes which must be separated for agri-food industries are: aluminum and steel cans, glass, PET, corrugated, wood, fine paper, and newsprint.

- Wet wastes are not required to be separated.

Legal Requirements: Beverage Container Regulation

- Provincial/Territorial

  - Different regulations, common themes:

    Product stewardship
    Container types must be approved
    Deposit / Refund / Environmental Fee
    Fees support recycling

Voluntary Action: Packaging Waste

- National Packaging Protocol (NAPP) - adopted by Canadian Council of Ministers of the Environment in 1990

- Voluntary packaging waste reduction targets for all industry

  - 20% reduction by December 31, 1992
  - 35% reduction by December 31, 1996
  - 50% reduction by December 31, 2000

- Beverage containers are regulated specifically by the provinces and territories.

- Regulations differ among jurisdictions, and new regulations are in development now.

- Some common themes in beverage container regulation in the provinces and territories are:

  - Product stewardship - requiring manufacturers to put waste management programs in place for their containers
  - Control over the type of containers through an approval system
  - Deposit system with full refund for refillables and an environmental fee for non-refillables
  - Use of the fee for non-refillables to support collection and recycling by municipalities

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- The National Packaging Protocol, an initiative of the Canadian Council of Ministers of the Environment, established voluntary targets for packaging waste reductions.

- These targets apply to all industry sectors.

- NAPP emphasizes 3R's : source reduction, reuse and recycling

- Principles of minimum negative impact on the environment and maintaining functionality of packaging are equally important

- Three targets for packaging waste reduction were established in the protocol.

- The 1992 target has been met by Canadian industry - a 21% reduction from 1988 levels was estimated.

Voluntary Action: Packaging Waste (cont')

- Canadian Industry Packaging Stewardship Initiative (CIPSI)

- Packaging Management Model
  - Levy on brand owners of all packaging
  - Fund municipal collection and recycling
  - Regulation to collect levies
  - Manufacturers, distributors, importers must pay

Voluntary Action: Wet Waste - Organics

- Industry Practices
  - Reprocessing, rendering, animal feed
  - Land application, donation, composting
- Canadian and Provincial Waste Exchanges
  - Match generators and receivers
  - Advice on reduction, diversion
- Provincial Recycling Councils

- The Canadian Industry Packaging Stewardship Initiative is a model of packaging management developed by a coalition of Canada's major packaged good and related industries.

- The model supports the NAPP 50% reduction target and would support expansion of recycling activity.

- The main features of CIPSI are:

  - Levy on brand owners of all packaging
  - Fund municipal collection and recycling
  - Regulation to collect levies
  - Manufacturers, distributors, importers must pay

- CIPSI sponsors are in discussion with the provinces to advance this approach.

- Wet waste is a significant waste stream component for most agri-food industry sectors.

- There are many established wet waste diversion methods used by food and beverage processors.

- Diversion methods accounting for the largest proportion of wet waste are:

  - Reprocessing, rendering and production of animal feed;
  - Land application, donation of food, and composting.

- Canadian and Provincial waste exchanges have helped to match generators and receivers of wastes in many industries. Wastes placed from the agri-food industry have included a wide range of off-spec food and beverage ingredients and products, and restaurant wastes and grease. The waste exchanges also offer consulting services to industry on waste reduction and diversion.

- Provincial recycling councils are also active in waste reduction.

Business Opportunities

- Value from Waste
  - Payment for recyclables
  - Processed food from culls
  - Animal feed, rendering, composting
- Costs Avoided
  - Source reduction in packaging
  - Reduced tipping fees
- Corporate Image
  - Product stewardship
  - Green marketing
  - Benefits of food distribution

- Reducing solid waste provides cost recovery opportunities when material is diverted from waste and converted to value added products.

- Costs can be avoided through source reductions and reduced tipping fees when wastes are diverted from landfill.

- Improved solid waste management can enhance corporate image and provide community benefits such as those from food bank donations.

Supplementary Information:
Solid Waste Reduction

SOLID WASTE REDUCTION

ENVIRONMENTAL ISSUES:

Landfill sites near some major Canadian urban centres will be closing soon. Obtaining environmental approval for new landfill space is difficult, time-consuming, costly and fraught with uncertainty. Recoverable resources in solid waste represent lost material, energy and labour.

INTERNATIONAL AGREEMENT:

Domestic priorities are the basis for legislation.

RESPONSE TO REDUCE THE ENVIRONMENTAL EFFECT:

Solid waste reduction programs are in effect at national, provincial and municipal levels. The Canadian Council of Ministers of the Environment (CCME) adopted a National Waste Reduction Strategy and undertook a commitment to a 50 percent reduction of the total amount of waste sent to disposal by 2000. Provinces and some municipalities have adopted this target. Emphasis is placed on the hierarchy of reduce, reuse, recycle, recovery, residuals disposal and remediation. The preferred approach to achieving the targeted waste reduction is voluntary and preventive, rather than regulatory. The provinces and territories have, however, indicated an intent to legislate waste reduction activities if necessary.

Packaging waste has been identified as a waste type of particular importance to the agri-food industry. The National Packaging Protocol (NAPP) calls for a 50% reduction of all types of packaging waste sent to disposal from all sources by the year 2000. The NAPP is described in the section entitled "Voluntary Action".

Diversion of wet waste from disposal has been industry practice in the food and beverage processing sector. The need to reduce waste further has enhanced this diversion through such means as reprocessing, rendering, animal feed, land spreading, composting and food donations. Reductions of food wastes in the retail and food service sectors are being achieved through some of these same strategies.

AGRI-FOOD INDUSTRY SECTORS MOST AFFECTED:

All sectors of the agri-food industry will be affected by the National Packaging Protocol (NAPP). The packaging waste reduction targets apply to all Canadian industry , all packaging material types, and all levels of packaging - primary, secondary

and tertiary.

Beverage containers are regulated as a special packaging type. Manufacturers, distributors, and vendors of beverages must meet regulations for beverage containers in each province or territory.

Ontario waste reduction legislation requires large manufacturers, importers, retailers and food service operators to reduce wastes and to source separate certain kinds of recyclable materials.

REGULATORY REQUIREMENTS:

Canada

There are no federal regulations which deal with reduction of non-hazardous wastes.

Provinces and Territories

Waste Reduction

Many provinces have begun the process of creating enabling legislation to address solid waste issues, chiefly packaging, and to issue regulations in support of a national objective of 50% waste reduction. Legislative activity in 1994 in three of the provinces is illustrative:

In Quebec, the Environmental Quality Act, LQE, was amended to provide for regulation of packaging reduction, recovered material content, and package labelling.

Manitoba passed a new Waste Reduction and Prevention Act, facilitating the Manitoba Product Stewardship Program, an industry-funded recycling initiative which targets two waste streams, one of which is consumer product packaging, including food and beverage packaging. The Beverage Container and Packaging Regulation has also been amended and a fee of two cents on all non-deposit containers is in effect to build a stewardship fund which will be used to support collection and recycling activities.

In Ontario, the 3R's regulations place requirements for waste reduction on municipalities and industrial, institutional and commercial waste generators. Large food and beverage processors, retailers and food service operators must conduct waste audits and prepare waste reduction workplans. Large food and beverage processors, packagers and importers must conduct packaging audits and prepare packaging reduction workplans. Source separation of specified recyclable materials is required of designated sectors.

Beverage Containers

Beverage containers are a special target for waste reduction programs, both voluntary and mandatory. The containers regulations are summarized for each province and territory in the table below:

Beverage Container Regulations - Provinces and Territories

British Columbia	deposit/refund for glass, metal and plastic containers for beer, ale, cider and carbonated beverages
Alberta	codes 1,2 exempt beverages and containers: beer & beer containers, milk & milk containers, aseptic and waxed paperboard packaging
Saskatchewan	codes 1,2 containers included: metal, plastic, glass, multi-material shelf stable; beverages exempt: milk
Manitoba	code 2 licensing of beverage container stewards
Ontario	code 3 beverages included: carbonated soft drinks minimum sales in refillable containers as percent of total for brand owners depends on recycling target sales area
Quebec	code 1 deposit/refund for all beer and soft drink containers
New Brunswick	codes 1,2,3
Nova Scotia	code 1,2 beverages exempt: milk
Prince Edward Island	beer and soft drinks may only be sold in refillable containers wine and liquor may only be sold in recyclable containers
Newfoundland	provision for regulation under the Packaging Materials Act but no regulations are in force for beverage containers

Yukon	code 2 containers included: aluminum cans for any beverage and refillable glass and non-refillable containers for liquor
Northwest Territories	no beverage container legislation

code 1 containers must be approved or registered for use
code 2 deposit/refund/environmental fee for non-refillable
code 3 preferential advertising/pricing for non-refillables
prohibited

Municipal

Municipal regulations include littering bylaws affecting food service vendors and retailers. Municipal tipping fees have risen in many areas in the last five years. Higher tipping fees or outright bans are in effect for certain packaging materials eg. corrugated and wood waste (pallets).

VOLUNTARY ACTION:

National Packaging Protocol

NAPP, adopted by the CCME in 1990, is aimed at reducing the environmental effects of packaging materials and reducing packaging waste. Voluntary targets for waste reduction, based on 1988 packaging consumption are as follows:

20% reduction by December 31, 1992;
35% reduction by December 31, 1996; and
50% reduction by December 31, 2000.

The 1992 NAPP milestone report indicated that the largest amount of packaging sent to disposal from the agri-food industry came from the fruit and vegetable, soft drink and retail grocery sectors. Breweries, while using the largest quantity of packaging of all agri-food sectors, reused more than 80% of packaging material and sent less than 5% to disposal.

Canadian Industry Packaging Stewardship Initiative (CIPSI)

CIPSI is a national model for managing packaging which is sponsored by six industry groups. It proposes a levy on brand owners of packaging, funding of municipal collection and recycling programs and provincial regulation to collect packaging fees. Manufacturers, distributors and importers of packaged goods would be required to participate. CIPSI has undertaken consultations with five provincial governments to develop support for the proposal. As of March 1995, none of the provinces have accepted the CIPSI model for packaging management.

Waste Diversion and Waste Exchange

The Canadian Waste Materials Exchange, the provincial waste exchange programs and provincial recycling councils provide assistance on waste reduction, and information on recycling opportunities for industrial, commercial and institutional users. The exchanges publicize lists of materials available or wanted and farmers, food processors and retailers can use the exchange listings to find suitable matches.

In Ontario, a multi-stakeholder group, the Strategy Team for Wet Waste Reduction, recently reported on wet waste management in the province, assessing the status quo and proposing a number of action plans to maximize diversion of wet wastes from disposal.

Municipalities

Multi-material collection programs for recyclables are co-ordinated and partially funded at the municipal level. Municipal composting of residential organic waste in some communities may be extended to commercial waste from the agri-food industry.

BUSINESS OPPORTUNITIES

Waste diversion can create value from waste through creation of new value-added products from waste, obtaining payment for recyclable packaging materials and food wastes that can be used directly as animal feed, or processed into feed and other products. Costs can be avoided through source reductions in raw materials for product and packaging and in reduced waste disposal fees. There are community benefits from donations of food to charities and corporate image can be enhanced by being perceived as working towards a community and national goal of waste reduction.

INDUSTRY PERFORMANCE

The indicator of industry performance proposed is the amount of packaging waste sent for disposal. The data for this indicator have been obtained from the National Packaging Monitoring System surveys for 1990 and 1992. Data on other waste streams are lacking, but as provincial waste reduction regulation comes into effect such as Ontario's 3R's regulations, more data will be available.

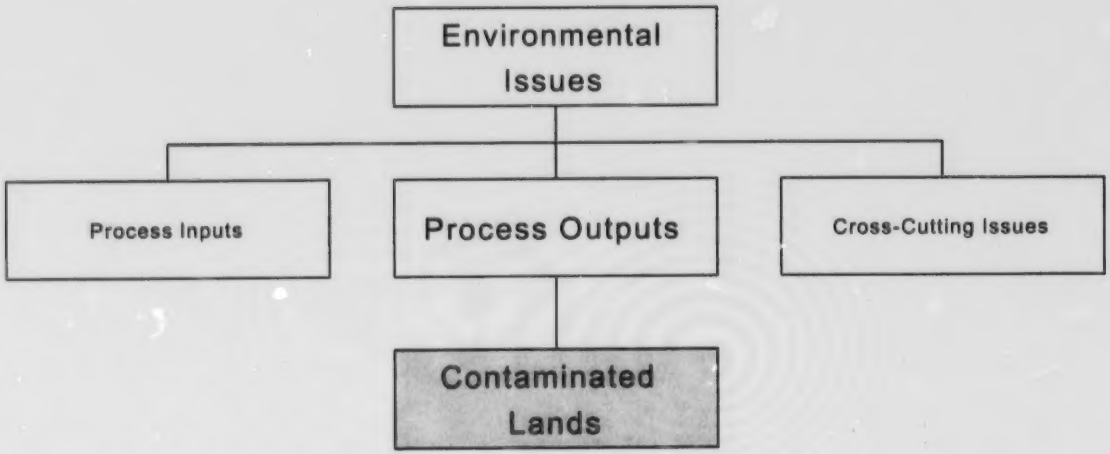
FUTURE CONSIDERATIONS

Enhanced waste diversion infrastructure for pathways including recycling, centralized composting, packaging redesign, land application of wet wastes will mean more opportunity for the agri-food industry to achieve waste reduction goals set by industry and government.

The CCME has recently announced that to achieve the 1996 NAPP reduction targets, emphasis will be placed on reducing waste disposal of old corrugated containers, plastic film, and wooden pallets

Module 10:
Contaminated Lands

CONTAMINATED LANDS



Issues

- Containment of contamination
- Human, ecosystem health risks
- Liability for site problems
- High cost of clean-up

Module 10 - Contaminated Lands

This module consists of 5 slides:

CL1	Title slide
CL2	Issues overview
CL3	Response to the issues
CL4	Most affected activities
CL5	Legal requirements - provincial / territorial

- Contaminated sites have become a priority because of the risks posed to human health and environmental quality by the spread of contamination from contaminated lands.

- Very significant costs may be associated with the clean up of a contaminated site, and the assignment of liability for costs requires careful consideration before concluding any real property transaction.

Response

- Regulation of liability and cleanup
- Identification of sites
- Remediation of contaminated sites
- Prevention through environmental management

Most Affected Activities

- Building and transportation fleet operations and maintenance
  - Underground storage tanks (fuels, oils)
  - Waste material storage, disposal
- Transfer of property title

- Provinces and territories are developing regulations to assign liability for contaminated sites.

- A national program has been established by federal, provincial and territorial governments to identify and clean up high-risk contaminated sites.

- Property owners and tenants have undertaken the identification and remediation of contaminated lands which may or may not be in use, and through management of hazardous materials, are preventing further contamination.

- The potential for creation of contaminated lands in the operation of agri-food industries may be low, but hazardous materials are used in building, equipment, and transportation fleet operations and maintenance.

- The storage of fuels and oils in underground tanks is of particular concern as is the storage of hazardous wastes on site.

- Past handling, storage and disposal practices may create current problems.

- The liability for contaminated land is a significant concern in the sale of property.

Legal Requirements: Provincial and Territorial

- Liability and costs may be assigned to
  - Property owners, tenants, consultants, creditors
  - Contaminant producers, transporters
- Provinces set criteria for site cleanup

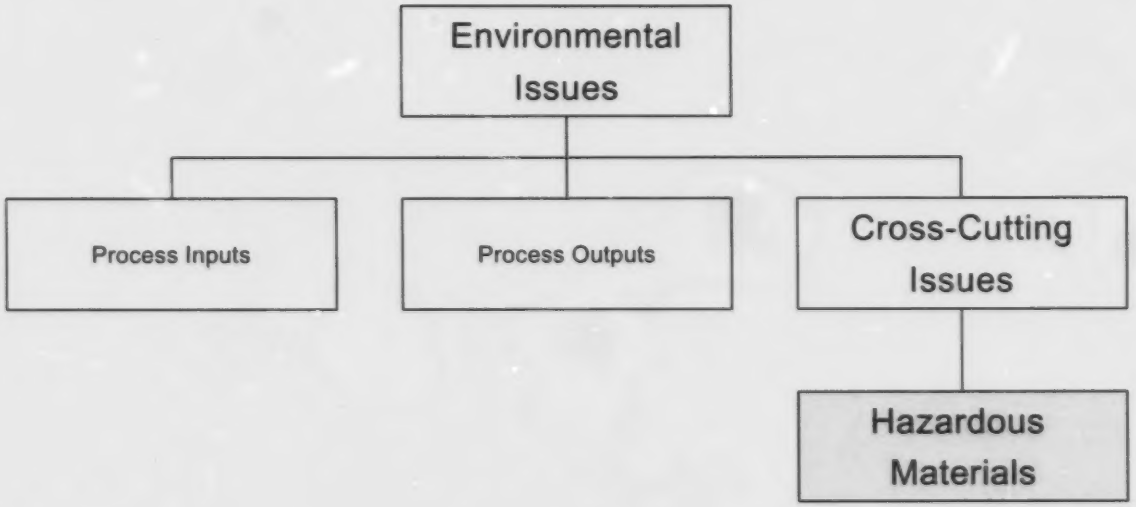
- Legislation on the issue of contaminated lands is in development and significant differences exist in the assignment of liabilities, as one example, among jurisdictions.

- Liability for costs and cleanup may be assigned to parties associated with a site as former or present owners, tenants, consultants, creditors, producers of the material which contaminated the site, and transporters of the material, among others.

- Standards and guidelines for cleanup and site decommissioning are also in development.

Module 11:
Hazardous Materials

HAZARDOUS MATERIALS



Issues

- Risk to humans, ecosystems and property
- Toxic, corrosive, flammable, other dangerous materials

Module 11 - Hazardous Materials

Note to presenters:

This module consists of 10 slides:

HM1	Title slide
HM2	Issues overview
HM3	Response to the issues
HM4	Most affected activities
HM5	Legal requirements- transportation
HM6	Legal requirements - pesticides - federal
HM7	Legal requirements - pesticides - provincial / territorial
HM8	Legal requirements - hazardous waste
HM9	Legal requirements - specially regulated substances
HM10	Voluntary action

- Hazardous materials present risks to human health and safety, to ecosystems, and to property.

- Several classes of hazardous materials are used in food and beverage processing, distribution, retail and service, either directly or in building and equipment operations. Among them are materials which are toxic, corrosive, flammable, and compressed gases.

Response

- Regulatory control for
  - Transportation
  - Pesticides
  - Hazardous waste
  - Specially regulated substances

Most Affected Activities

- Pesticide use in all sectors
- Dangerous goods in food processing
  - Acids, solvents, compressed gases
- Plant and equipment O & M with dangerous goods
  - Refrigerants, cleaners, oils, fuels, gases.

- The regulatory control of environmental effects of hazardous materials is organized into four broad areas: transportation, pesticides, wastes, and specially regulated substances.

- The occupational health and safety aspects of hazardous materials are not reviewed in this presentation.

- Hazardous materials used in agri-food include pesticides in a variety of applications.

- Some types of food and beverage processing and service require use of materials that are acids, solvents, and compressed gases. For example, acetic acid in pickling, hexane in natural oil extraction, and carbon dioxide in carbonated beverages.

- Hazardous materials are used in several aspects of plant and equipment operation and maintenance activities.

Legal Requirements: Transportation

- Federal and Provincial/Territorial - Transportation of Dangerous Goods Act and Regulations

  - Dangerous goods classified
  - Duties of consignors, carriers, consignees
  - Training, documentation, labelling, handling, emergency response, reporting

Legal Requirements: Pesticides

- Federal - Pest Control Products Act and Regulations
  - Registration of pesticides
  - Labelling of containers
- New Pest Management Regulatory Agency - 1995

- Transportation of dangerous goods is regulated in a uniform system in Canada through legislation at federal, provincial, and territorial levels.

- There is a system for classifying goods according to properties, and the duties of consignors, carriers, and consignees are specified.

- These duties include training, documentation of shipments, labelling of dangerous goods, safe handling, emergency response for spills, and reporting procedures.

- Pesticides are regulated at the federal level through a registration system which controls the type of pesticides in use and also through a labelling requirement including directions for conditions of use.

- Federal activity in pesticide regulation has been consolidated in a single Pest Management Regulatory Agency in 1995

Legal Requirements: Pesticides (cont')

- Provincial/Territorial - Pesticide Control Acts and Regulations

  - Licensing of vendors, distributors, pesticide applicators
  - Controlled use, storage, handling, disposal, container disposal
  - Documentation, record keeping, reporting

Legal Requirements: Hazardous Waste

- Provincial/Territorial - Waste Management Acts
  - Wastes classified
  - Generator registration
  - Waste manifests track shipments
  - Controlled storage, handling, transport, disposal
- Transportation of Dangerous Goods legislation also applies to waste

- Provincial legislation typically requires licensing of parties who handle pesticides commercially.

- Vendors, distributors and applicators must be licensed.

- A scheme of classes of license for pesticide applicators is in force in several jurisdictions, qualifying individuals to handle different types of pesticide.

- Other provincial regulatory controls deal with aspects of material handling and record keeping.

- Hazardous wastes are regulated separately from new materials which are dangerous.

- Hazardous wastes must be classified, generators of wastes must be registered for the wastes generated, and shipments of wastes are tracked through a waste manifest system from the generator to the disposal or processing facility.

- The storage, handling, transport and disposal of hazardous wastes are regulated.

- The transportation legislation for dangerous goods applies to movement of hazardous wastes.

Legal Requirements: Specially Regulated Substances

- Special handling, disposal requirements
  - Used oils, PCBs, asbestos, radioactive material, other
- Special reporting requirements
  - National Pollutant Release Inventory substances
- New Toxic Substances Management Policy
- Ontario Bans, Phaseouts and Reductions

Voluntary Action

- CCME commitment: 50% diversion of hazardous waste
- Accelerated Reduction and Elimination of Toxics (ARET)
- Great Lakes Pollution Prevention Initiative
- Regional Action Plans eg St Lawrence
- Ontario Pollution Prevention Pledge

- Federal and provincial regulations have been established for a number of specific substances, including used oils and lubricants, polychlorinated biphenyl-contaminated materials, asbestos, and radioactive material.

- Two special reporting requirements for the use or production of certain chemicals may affect a few companies in the agri-food industry:

  - The National Pollutant Release Inventory lists 178 chemicals for which reporting is required.
  - The federal New Substance Notification Regulations also entail reporting requirements.

- A new toxics management policy for Canada is under development. It is expected to set control strategies for substances that meet criteria of toxicity, persistence, and bioaccumulation.

- Ontario has developed a list of candidate substances for bans, phaseouts and reductions. Some of these substances may be regulated in the future, but the impact on post-farmgate agri-food industries should be small.

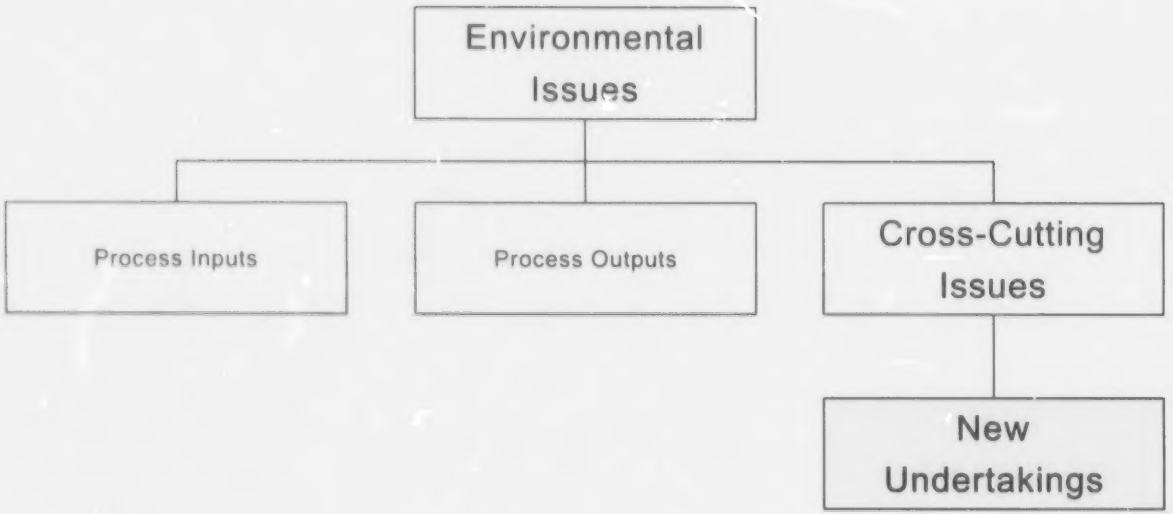
- The Canadian Council of Ministers of the Environment objectives for solid waste reduction include a goal of 50% diversion of hazardous waste from specialized off-site treatment and disposal facilities.

- Several voluntary initiatives to reduce toxic emissions from industry have been established.

- Most of these voluntary initiatives have no major direct implication for the food and beverage processing industries but the approach of voluntary reductions may be extended to include agri-food.

Module 12:
New Undertakings

NEW UNDERTAKINGS



Issues

- Management of impacts from new developments
  - New plants, greenfield projects
- Control of contaminant releases
  - New or altered emissions
- Public participation in decision-making

Module 12 - New Undertakings

Note to presenters:

This module consists of 8 slides:

NU1	Title slide
NU2	Issues overview
NU3	Response to the issues
NU4	Most affected sectors - environmental assessment
NU5	Most affected sectors - authorisations & permits
NU6	Legal requirements - environmental assessment - federal
NU7	Legal requirements - environmental assessment - provincial / territorial
NU8	Legal requirements - authorisations and permits

- Two categories of undertakings are considered:
  - Greenfield projects, meaning the construction of a new plant; and
  - Modifications or additions to an existing facility.
- The overriding issue in the requirement for assessment, approval, and permitting is a need to manage development in a sustainable way in communities.
- Additional pressure comes from the need to manage environmental impacts of new developments, to control contaminant releases, and from an increasing demand for public participation in decision making.

Response

- For new facilities, greenfield projects
  - Environmental assessment or approval process
- For new or altered emission type or quantity
  - Regulation through authorisations and permits

Most Affected Sectors: Environmental Assessment

- Primary food processing plants require project approval, not full assessment in most cases, but some exceptions

- The regulatory response has been to set in place criteria for determining the level of assessment or project review required for major new undertakings.

- For plant modifications or additions, an authorization or permit is usually required for new or altered emissions.

- Food and beverage processing plants are typically excluded from provincial requirements for environmental assessment, but project approval prior to finalisation of plans is required in several jurisdictions.

Most Affected Sectors: Authorisations and Permits

- Primary and secondary food processing facilities with significant emissions to air, land, or water
- Also Affected:
  - Any new or modified operation with emissions may require a permit
- Municipal Zoning
  - Primary food processing with odour, particulate, noise

Legal Requirements: Environmental Assessment

- Federal - Canadian Environmental Assessment Act & Regulations

- Assessment required if
  - Federal funding
  - Federal lands
  - Specific federal laws apply

- Under provincial legislation for waste emissions, any operation from a large factory to a small restaurant may be required to obtain a permit or authorization for the emission. Primary and secondary food processors with significant discharges will be most affected by these requirements.

- Assessments under the new Canadian Environmental Assessment Act and regulations would only be required under a limited set of conditions - if federal funding or federal lands were involved in the development of the undertaking, or if a licence or permit were required under certain federal legislation.

Legal Requirements: Environmental Assessment (cont')

- Provincial/Territorial - Environmental Assessment Legislation

  - Food and beverage generally exempt from assessment
  - Size thresholds and ministerial discretion may compel assessment
  - Scope of assessment can vary

  - In BC, a size threshold proposed for EA for fish, meat, and poultry processing plants

Legal Requirements: Authorisations and Permits

- Provincial/Territorial - Environmental Protection Legislation
  - New or changed emission to air, water, land needs authorisation
- Municipal
  - Zoning Bylaws
  - Increased powers for project approvals

- Provincial and territorial environmental assessment legislation generally exempts new food and beverage processing plants from the assessment process, but ministerial discretion may be used in some jurisdictions to determine whether an assessment or a project approval is required.

- The scope of the environmental assessment can vary with the project nature and the jurisdiction.

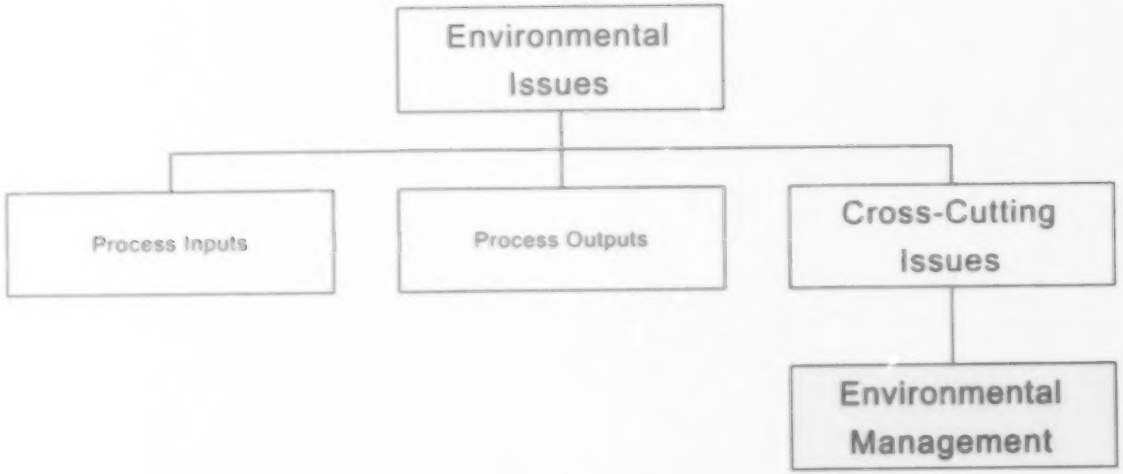
- Under proposed environmental assessment legislation in British Columbia, a size threshold would be applied to fish, meat, and poultry processing plants to determine the need for an environmental assessment.

- The requirement for authorization to discharge emissions to air, water or land is in provincial regulation under a general environmental protection law or legislation that deals with water or air quality.

- Municipalities have authority over local zoning and some municipal or regional governments have authority over environmental discharges to air and to water within the municipality.

Module 13:
Environmental Management

ENVIRONMENTAL MANAGEMENT



Issues

- Good corporate citizenship
- Competitive advantage in trade
- Avoiding environmental offences
- Establishing due diligence

Module 13 - Environmental Management

Note to presenters:

This module consists of 5 slides:

NU1	Title slide
NU2	Issues overview
NU3	Response to the issues
NU4	Voluntary action - ISO 14000
NU5	Business opportunity

- Comprehensive corporate environmental management policies can address several needs of companies.

- Companies need to act and be perceived as acting in an environmentally responsible manner in their communities - good corporate citizens.

- Good environmental performance enhances business and trade opportunities as individual and organisational business and purchasing decisions are influenced by environmental considerations.

- An effective environmental management program can maintain regulatory compliance, and may help reduce liability for offenses.

Response

- Corporate environmental management programs
  - Policy, procedures, responsibilities
  - Compliance/leadership audits
  - Communicating and Consultation

Voluntary Action

- ISO 14000 Environmental Management

- Standards in Development
  - Environmental Management Systems
  - Environmental Auditing
  - Environmental Labelling
  - Environmental Performance Evaluation
  - Life Cycle Assessment
- Parallels to ISO 9000 Quality Assurance

- Corporations have responded by instituting programs to manage environmental affairs. The key elements of these programs are typically:

  - A set of policies and procedures which form the basis of the corporate "green plan". Corporate objectives for environmental performance and the means of attaining these goals are clearly expressed. Responsibilities for operations that impact the environment are clearly set out.

  - An independent auditing mechanism can be used to determine regulatory compliance and can also be used to assess how well the corporation is doing when compared to industry leaders across a number of non-regulatory environmental issues. Part of the auditing process is planning to implement corrective actions arising from the audit.

  - Communication and consultation are important within both the organization and the community, to obtain commitment and avoid unforseen problems.

- The Canadian Standards Association is managing the International Organization for Standardization (ISO) technical committee charged with developing a set of international standards for environmental management and is also developing Canadian environmental management guidelines.

- Standards in development for ISO 14000, Environmental Management, include

  - Environmental Management Systems
  - Environmental Auditing
  - Environmental Labelling
  - Environmental Performance Evaluation
  - Life Cycle Assessment

- Certification to ISO 14000, when the standards are finalized, may become just as necessary for manufacturers as the quality management standard, ISO 9000, has become in some sectors.

Business Opportunity

- Reduced frequency & severity of environmental problems
  - Market development for green products
  - Product life cycle cost reductions, waste avoidance
  - Better community, employee relations

- Establishing an environmental management program helps a company anticipate and manage the issues.

- The benefits include reducing product life cycle costs, and avoiding waste, as well as positioning the business to market products with improved environmental performance.

- Costs can be avoided through a reduced frequency and severity of environmental problems.

- Benefits can also be realized in improved community and employee relations.

Module 14:
Indicators of Environmental Performance

INDICATORS OF ENVIRONMENTAL PERFORMANCE

How is the Industry Doing?

Indicators

- Indicators should be:
  - Relevant
  - Instructive
  - Supported by sufficient, credible data
- Unfortunately, suitable data is scarce

Module 14 - Indicators

Note to presenters:

This module consists of 10 slides:

IEP1 Title slide
IEP2 Indicator characteristics
IEP3 Three indicators recommended
IEP4 Resource consumption indicator
IEP5 Energy intensity bar graph, food and beverage industries
IEP6 Climate change indicator
IEP7 Carbon dioxide emissions bar graph, food industry
IEP8 Carbon dioxide emissions bar graph, beverage industry
IEP9 Solid waste indicator
IEP10 Packaging disposed by food and beverage industries

- An accepted way of examining the environmental performance of an industry and observing change is through the use of carefully chosen indicators.

- The indicators chosen to represent industry performance must be:

  - Relevant: They must be indicative of the key environmental issues of the industry.

  - Instructive: They must inform about environmental impacts that arise from industry practices and they must relate to the key issues.

  - Supported by data: Indicators should be based on reliable data that provides national or extensive regional coverage over several years.

- A very serious limitation in proposing indicators is the scarcity of data for the agri-food industry on environmental performance.

Three Indicators

Environmental Issue	Recommended Indicator
Resource Consumption	Energy Use
Climate Change	CO_2 Emissions
Solid Waste	Packaging Usage

Resource Consumption -- Energy Use

- Recommended Indicator:
  - Energy Intensity by Processing Sector
  - Expressed in Tera joules per million dollars of shipments
  - Based on CIPEC Data for 1990, '91, '92

- We are able to recommend only three indicators relating to the issues discussed in this presentation.

- This cannot be a complete profile, but it is a start.

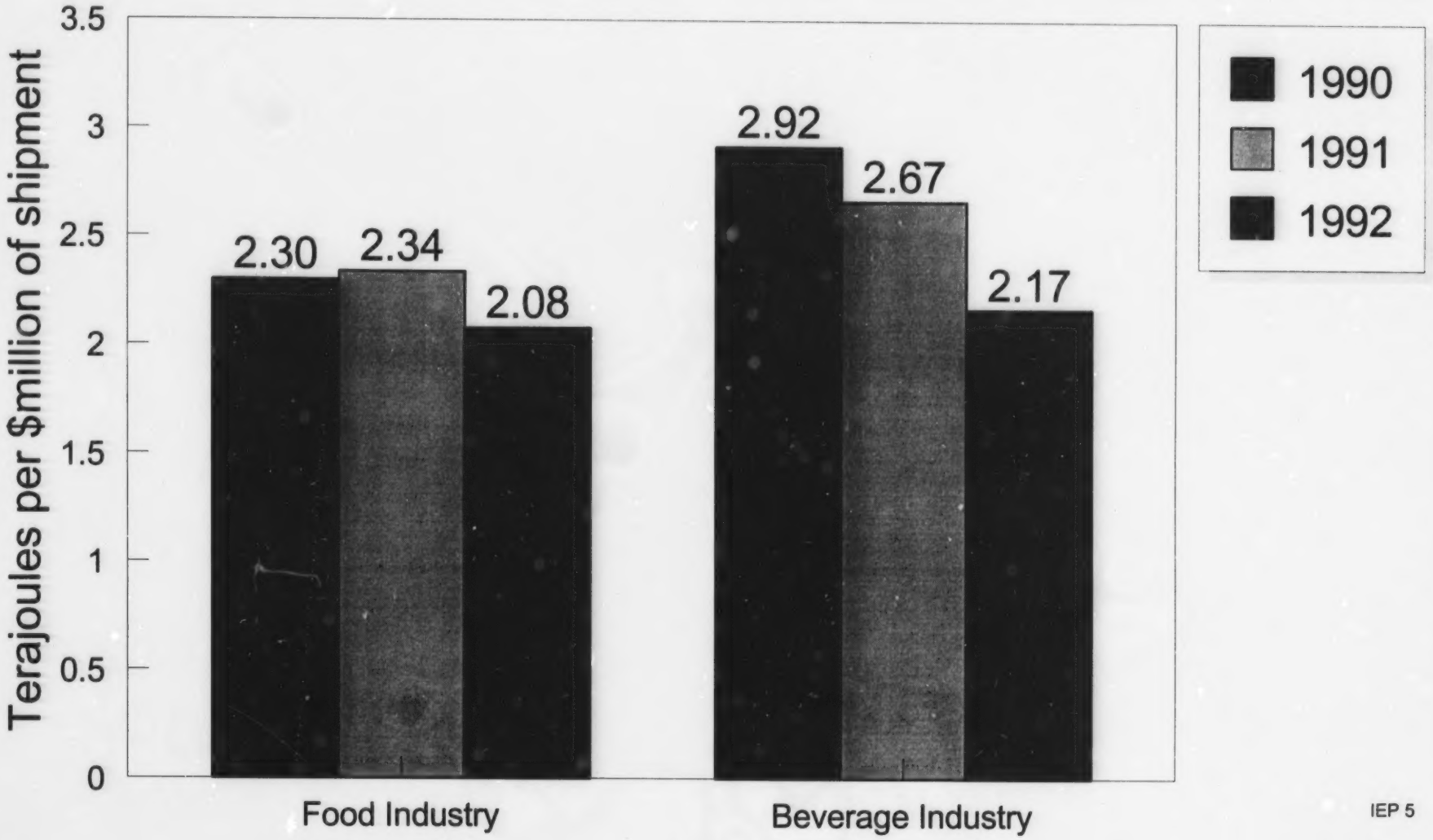
  - Resource Consumption → Energy Use
  - Climate Change → Carbon Dioxide Emissions
  - Solid Waste → Packaging Use

- Our first indicator is concerned with resource consumption. The specific indicator is energy intensity, that is energy consumed per dollar value of shipments, by industry sector.

- This information is available by processing sector for 1990, '91, and '92, from the Canadian Industry Program for Energy Conservation.

- The food processing industry is taken as all industries classified as SIC major group 10 companies and the beverage processing industry is all SIC major group 11 companies.

Energy Intensity of Food and Beverage Processing
1990 - 1992



Climate Change -- Carbon Dioxide Emissions

- Recommended Indicator:
  - Total Carbon Dioxide Emissions by Processing Sector
  - Expressed in tonnes of carbon dioxide
  - Based on CIPEC Data for 1990, '91, '92

- This graph shows that energy intensity decreased in beverage processing industries from 1990 to 1992 by about 25%.

- Energy intensity in the food processing sector decreased in 1992 by about 10% from 1990-91 levels.

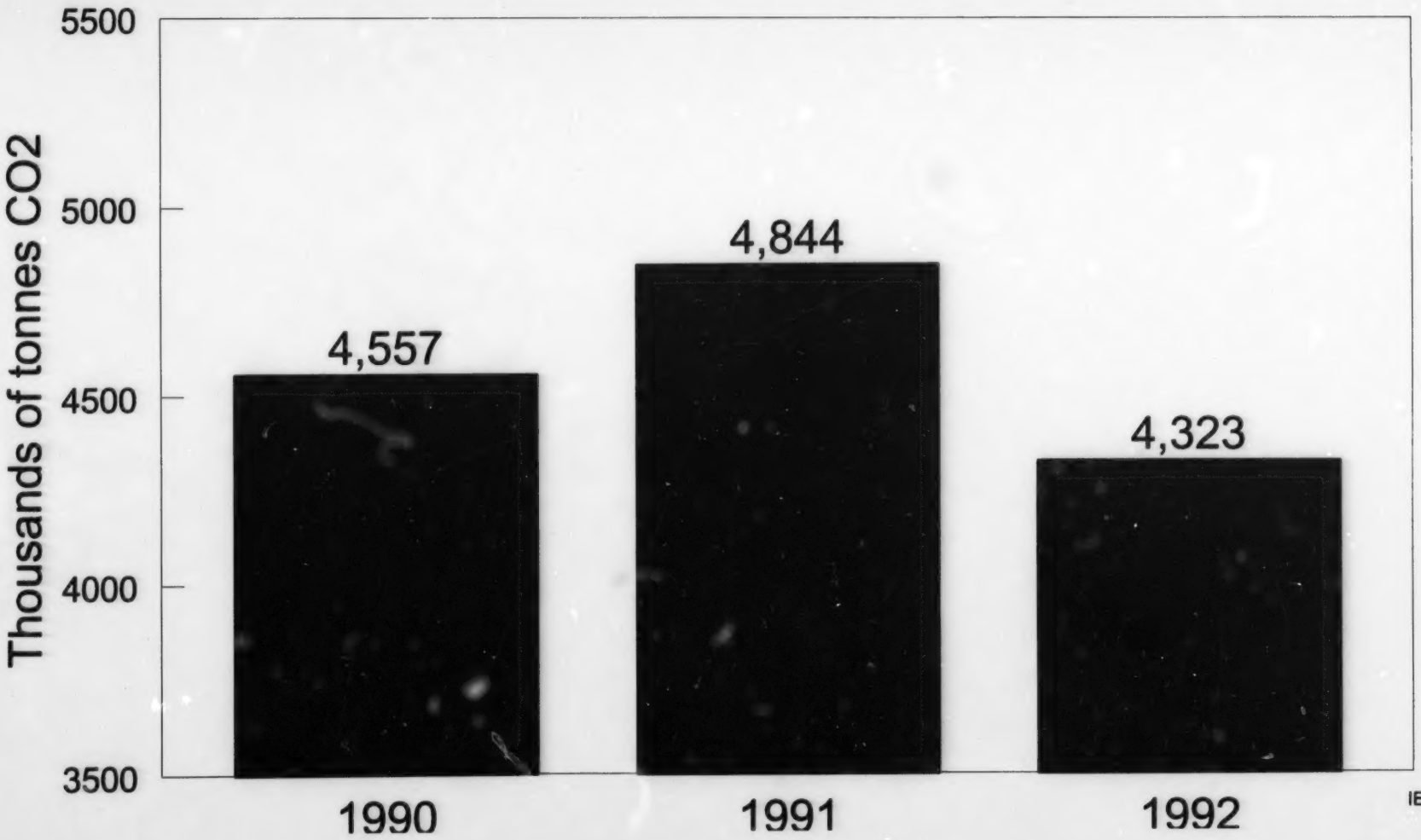
- Our second indicator addresses the climate change issue.

- It would be desirable to include all greenhouse gases in an indicator for global warming; however, data are not available for gases other than carbon dioxide related to energy consumption.

- Carbon dioxide emissions are derived from energy consumption, taking account of the source of energy. Different emission factors are used for each fuel type.

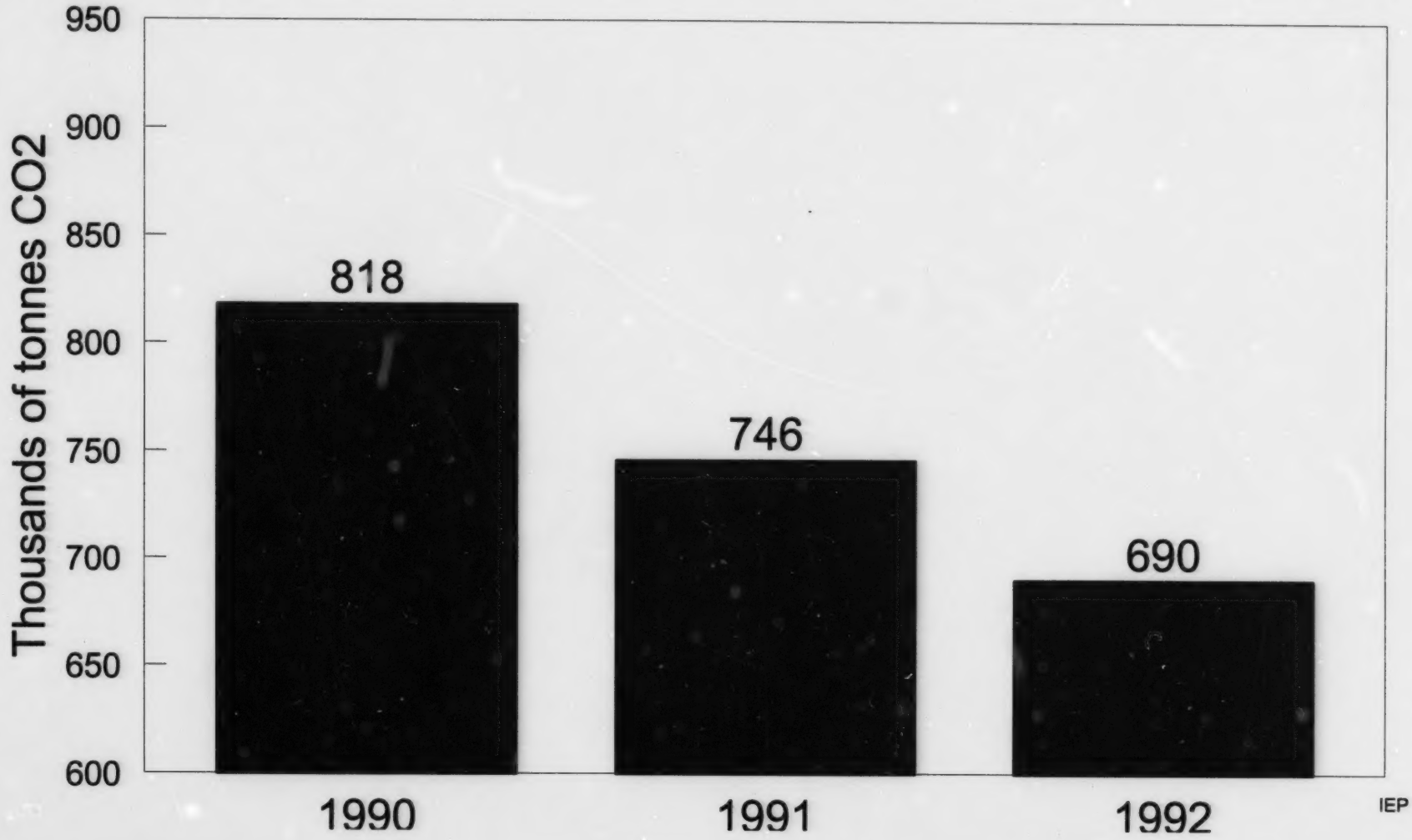
- Our indicator is the total carbon dioxide emissions from energy consumption by the sector.

Carbon Dioxide Emissions: Food Industry
1990 - 1992



IEP 7

Carbon Dioxide Emissions: Beverage Industry
1990 - 1992



IEP 8

- Food industry emissions of carbon dioxide fluctuated from 1990 to 1992 without an apparent trend.

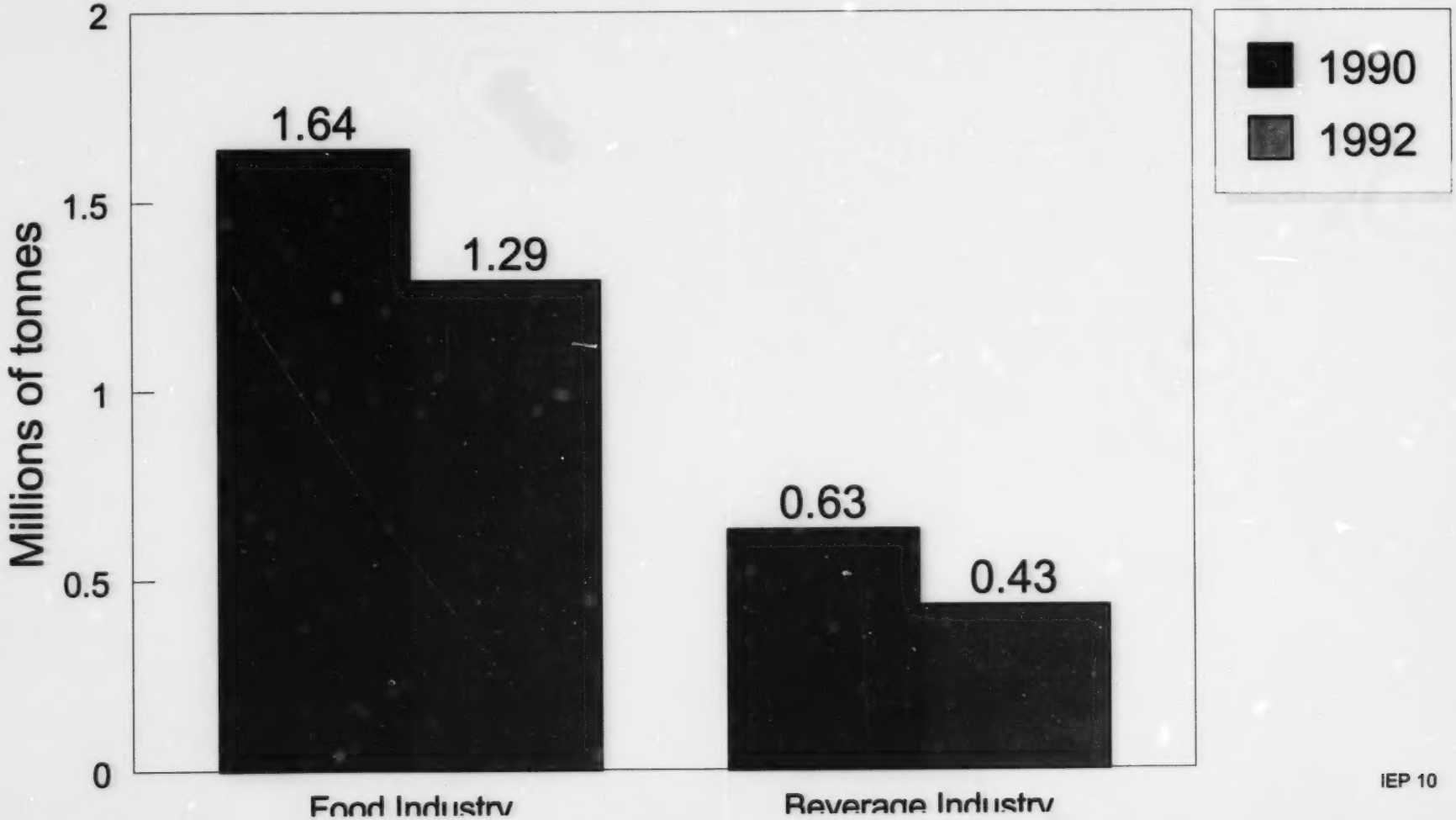
- Note that the National Action Program on Climate Change has set a target for stabilization of greenhouse gases by 2000 to levels measured in 1990.

- Carbon dioxide emissions in the beverage processing sector decreased in the three year period. *Data from wineries have not been included in the totals due to confidentiality of data.*

SOLID WASTE -- PACKAGING USE

- Recommended Indicator:
  - Amount of Packaging Disposed by Processing Sector
  - Expressed in tonnes of packaging material disposed
  - Based on: National Packaging Surveys 1990, 1992

Packaging Disposed by Industry Sector
1990 and 1992



- Our third indicator is for solid waste. Indicators for all waste types would be desirable, but national data are available only for packaging waste.

- The indicator is the total amount of packaging material sent to disposal by each industry sector.

- This data is now available for 12 agri-food industry sub-sectors, including wholesale and retail. Food service is not separately identified from other hospitality industries.

- This graph shows that the amounts of packaging materials sent to disposal from both the food and beverage industries declined significantly from 1990 to 1992.

- The decrease was approximately 21% for food industries and 32% for beverage industries in those two years.

- The National Packaging Protocol target reductions are 35% in 1996 and 50% in 2000 from 1988 levels.

Module 15:

Agri-Food Industries and the Environment -- Conclusion

AGRI-FOOD INDUSTRIES AND THE ENVIRONMENT -- CONCLUSION

What are the trends?

- Environmental Performance and Market Access
- Increased Use of Non-Regulatory Instruments
- Participation of an Informed Public

Module 15 - Agri-food Industries and the Environment: Conclusion

Note to presenters:

This module consists of 6 slides:

CR1 Title slide
CR2 What are the trends?
CR3 Environmental performance and market access
CR4 Increased use of non-regulatory instruments
CR5 Participation of an informed public
CR6 This presentation - summary

- The voluntary and regulatory measures which were highlighted for each issue indicate some trends that are expected to continue to influence environmental activities of Canadian business and the agri-food industry.

- Market access, both domestic and international, will be affected by the corporate record of environmental performance. Independent certification of company status may be required to establish a favourable environmental record.

- As governments face cut-backs in operations, increasing reliance can be expected on non-regulatory methods of achieving environmental objectives.

- The public has a higher level of awareness of environmental issues, more access to information about business and government activities, and in some jurisdictions, significant rights of intervention in the administration of environmental law.

Environmental Performance and Market Access

- Green procurement
- Ecolabelling of food products or services
- Niche markets and green products
- International trade

- Market access and product development may be influenced by environmental factors in a number of ways:

- Green procurement policies of all levels of consumers, formalized in the case of governments and institutions, are now in place for a number of commodities and services.

- As authoritative environmental labels for food products, packaging, and services are made available, adoption of these reference points for use in procurement by large purchasing organisations may be expected.

- Labels for particular environmental or social aspects of food or beverage production are already established in the marketplace. Some examples are labels for organically grown produce, dolphin-safe tuna, and a range of private-brand green product labels.

- The potential for a Canadian environmental label for food and beverages was recently studied by Agriculture and Agri-Food Canada, but is not under active development.

- The market for products distinguished by environmental criteria is expanding. Companies which continue to develop new products that respond to the niche market created by environmentally conscious consumers will benefit from the trend.

- Just as ISO quality management standards have become an important factor in international trade for Canadian industry, the implementation of ISO environmental management standards may become necessary for exporters

Increased Use of Non-Regulatory Instruments

- Voluntary agreements in pollution prevention
- Taxes to reduce resource consumption and waste production
- Product stewardship through the life-cycle

Participation of an Informed Public

- Corporate environmental reporting
- Regulatory non-compliance reporting
- Environmental rights legislation

- The current trend toward setting national or regional objectives to be met by voluntary measures to reduce environmental harm will continue; however, governments will also develop regulations to achieve the objectives as required.

- The use of economic instruments such as taxes on resource consumption (for example full cost pricing on water) and on waste production (for example full cost pricing on solid waste disposal) may cause industries to modify processes and reduce impacts.

- Product stewardship will continue as an important theme for the nineties as companies will be expected to be responsible for the environmental impacts of a product through its full life cycle

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- Participation of an informed public in decision making and consultations is a trend which is expected to continue.

- Companies are providing more information to the public about environmental activities through annual reports, community consultations, advertising and other means.

- Provincial and federal governments are providing more information to the public on charges laid under environmental laws and non-compliance of companies.

- Environmental rights legislation in the two territories and Ontario empower citizens to appeal permits, approvals, and government decisions.

- Citizens may compel government investigations and commence private prosecutions for environmental offenses in cases where the government has not acted.

THIS PRESENTATION

Agri-food industries and the environment:

- Why is this topic important?
- What are the issues?
- How is industry doing?
- What are the trends?

- In conclusion, we return to the opening slide to summarize some of the key points. The environmental pressures facing business to-day will continue to be important and must be well managed as an integral part of daily operations.

- The important environmental issues for the agri-food industry have been reviewed and while some are of importance to all business, others such as packaging waste and replacement of CFCs used in refrigeration have particular significance for this industry.

- A few indicators of performance have been proposed to gauge how the industry is doing, but data are very limited.

- Finally, the trends indicate more emphasis on environmental matters by an informed public. At the same time, governments are relying more on voluntary and economic measures rather than regulation to achieve environmental objectives.

- The agri-food industry has some significant challenges and important contributions to make towards national environmental objectives. Together with these challenges are opportunities to profit from making business environmentally sustainable as well as economically sound.

Sources of Information

Sources of Information

The slide deck *Creating a Framework of Environmental Activities* presented an overview of environmental issues and related mandatory and voluntary activities affecting businesses in the agri-food industry. This document presents some of the key information sources which presenters of the slide deck and audience members may wish to consult to obtain more detailed or current information.

All Modules - Environmental Legislation

For mandatory activities arising from legislative requirements, the most important sources of information are contacts in government departments at all levels, law reporting services, and environmental regulatory periodicals.

Environmental department contacts for federal, provincial, territorial and most major municipal governments are published annually in:

Canadian Environmental Directory
Canadian Almanac and Directory Publishing, Toronto, Ontario
Tel: 416-972-6645.

Two law reporting services which publish the full text of environmental legislation for federal, provincial and territorial governments are:

Canadian Environmental Law (Second Edition)
Butterworths Canada Ltd., Markham, Ontario
Tel: 905-479-2665.

ECO/LOG Canadian Pollution Legislation
Corpus Publishers Services Ltd., Toronto, Ontario
Tel: 416-920-8560

Three environmental regulatory periodicals which report on new legislation, enforcement activity, voluntary programs, and developments in environmental policy and trends are:

Canadian Environmental Regulation and Compliance News
Templegate Information Services Inc., Toronto, Ontario
Tel: 905-873-6424

ECO/LOG Week
Southam Magazine and Information Group, Don Mills, Ontario
Tel: 416-445-6641

Environment Policy and Law
Carswell Thomson Professional Publishing, Scarborough, Ontario

Tel: 1-800-387-5164

Further to the information sources on regulatory activity, individuals may wish to consult some of the references which are specific to each module, as provided below. note that Environment Canada publications identified with a DOE catalogue umber are available from the Environment Canada Inquiry Centre at 1-800-668-6767. Some of these documents, as well as news announcements and other material, can be accessed on the Internet at http://www.doe.ca, Environment Canada's web site (called the Green Lane).

Module 2 - Resource Consumption

Key Contacts

Canadian Industrial Program for Energy Conservation
Bengt Larsen
Executive Director, CIPEC Secretariat
Tel: 416-798-8155

Louise Métivier
CIPEC Industry Analyst
Natural Resources Canada
Tel: 613-995-2692

Other Sources

Energy and Water Use Reduction and Pollution Prevention in the Ontario Meat and Poultry Industry
Ontario Ministry of Environment and Energy, 1994
Tel: 416-323-4663
Document # 94-8053-02-00.01

See also references in Module 5, Climate Change.

Module 4 - Ozone Layer Depletion

Key Contacts

Commercial Chemicals Branch, Environment Canada
Bernard Madé
Tel: 819-994-3249

Canadian Halon Information Centre
Tel: 1-800-463-8244

Heating, Refrigeration and Air Conditioning Institute

Tel: 905-602-4700

Key Document

Canada's Ozone Layer Protection Program - A Summary
Environment Canada, 1994
DOE Catalogue # En40-442/1994

Module 5 - Climate Change

Key Contact

Climate Change Voluntary Challenge and Registry Office
Sue Kirby
Natural Resources Canada
613-996-6474

Key Document

Canada's National Action Program on Climate Change
Environment Canada, 1995
ISBN 0-662-60347-8

See also sources for energy conservation in Module 2.

Module 6 - Ground Level Ozone

Key Contact

NO_x/VOC Program Office
Pierre Pinault
Environment Canada
Tel: 819-953-1143

Key Document

CCME NO_x/VOC Management Plan Status Report 1994
Canadian Council of Ministers of the Environment
DOE Catalogue # CCME-NV86-E

Module 7 - Air Pollution - Local Priorities and Module 8 - Water Pollution

The most important information sources for the environmental issues represented in these

modules are the applicable provincial and territorial air and water quality regulations and government contacts. Discharges to sewers are subject to municipal legislation, and in some municipalities such as Greater Vancouver and Montreal, responsibility for administration of air pollution legislation has been assumed by municipal government. Municipal and regional government by-laws and officials should be consulted for information on permits, limits and monitoring requirements for air and water emissions.

Module 9 - Solid Waste

Key Contact

Canadian Industry Packaging Stewardship Initiative
Sandra Banks
Senior Vice President, Government Affairs
Grocery Products Manufacturers of Canada
Tel: 416-510-8024

Key Documents

National Packaging Protocol
Canadian Council of Ministers of the Environment, 1990
Publication #CCME-TS/WM-FS 020

National Packaging Protocol 1992 Milestone Report
Canadian Council of Ministers of the Environment, 1994
DOE Catalogue # CCME-EPC-NAPP-81E

Packaging Audits and Packaging Reduction Workplans
Canadian Council of Ministers of the Environment, 1992
DOE Catalogue # EPC-NAPP-44E

Diverting Wet Waste from Disposal: Progress and Action: A Report by the Ontario Team Team for Wet Waste Reduction
Queen's Printer for Ontario, 1994
Catalogue # PIBS 3154e

Module 10 - Contaminated Lands and Module 12 - New Undertakings

McCarthy Tétrault Digest of Environmental Law and Environemntal Assessment
Carswell, Scarborough, Ontario, 1992 to present
Tel: 416-609-8000

Environmental Approvals in Canada: Practice and Procedure
Butterworths Canada Ltd., Markham, Ontario, 1989 to present

Tel: 905-479-2665

See also the books referenced in Module 13, Environmental Management.

Module 11 Hazardous Materials

Key Contact

National Pollutant Release Inventory Office
François Lavallée
Environment Canada
Tel: 819-994-4073

Pest Management Regulatory Agency
Pesticide Information Line
Tel: 1-800-267-6315

Key Documents

Toxic Substances Management Policy
Environment Canada, 1995
DOE Catalogue # EN 40-499/1,2,&3

For management of hazardous waste and transportation of dangerous goods, the specific provincial and territorial legislation and relevant government contacts should be consulted. Legislation at all levels of government may place conditions on purchase, use, and disposal of specially designated substances.

See also the books referenced in Module 13, environmental Management.

Module 13 - Environmental Management

Key Documents

ISO 14000 Environmental Management System Guidelines and Standards
Standards Council of Canada
Tel: 613-995-4564

Environmental Law and Business in Canada
Thompson, Geoffry, McConnell, M.L., and Huestis, L.B., 1993
Canada Law Book Inc., Aurora

Environmental Management in Canada
B. Ibbotson and J-D. Phyper eds., 1994
McGraw-Hill Ryerson, Whitby